

CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	ELECTRICAL POWER								
Job Area	THREE PHASE ELECTRICAL INSTALLATION & MAINTENANCE								
Competency Unit Title	THREE PHASE DRAWING								
Competency Unit Descriptor	Three phase drawing is covering the scope of competency to carry out three phase wiring activities for Three phase based on drawing given by utilizing three phase wiring tools, equipment and materials in compliance with Electrical Act 1990, Electrical Regulation 1994 and other related rules and regulations body and statutory requirements. The personnel who are competent in the three phase electrical drawing must be able to identify drawing specification for three phase three phase wiring and carry out drawing according to standard requirements.								
Competency Unit Code		Competency Type	Core	Level	3	Training Duration	108	Credit Hours	
Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria			
1. Identify three phase drawing specifications and requirement	i. Procedure of site visit and evaluation ii. Technique to produce layout drawing iii. Calculation of diversity factor iv. Bill of quantity (BQ) v. Types of calculation <ul style="list-style-type: none"> • Total connected load (TCL) • Maximum Demand (MD) vi. Diversity factor vii. Various type of conductor: <ul style="list-style-type: none"> • Copper • Aluminum 			6 hours	Lecture	i. Layout plan sketched according to requirement ii. MD & TCL calculated correctly iii. Selection of protection devices, and cable listed out			

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> viii. Various type of cable, such as: <ul style="list-style-type: none"> • XLPE/SCT/PVC • PVC/PVC • PVC/SWA/PVC • XLPE/SWA/PVC viii. Various type of protection devices: <ul style="list-style-type: none"> • MCB,MCCB • RCCB/ELCB • Fuse ix. Types of three phase wiring <ul style="list-style-type: none"> • Surface wiring • Conceal wiring • Conduit wiring • Conceal conduit Wiring • Ducting wiring • Trunking/Casing • Cable tray • Underground x. Earthing/grounding requirement xi. Electrical Act & Regulation and Standard <ul style="list-style-type: none"> • Energy Commission Act 2001 • Electricity Supply Act 					

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	1990 (Act 447) <ul style="list-style-type: none"> • Electrical Regulation 1994 • MS 1936: 2006 / IEC 60364 • MS 1979: 2007 (COP) Electrical Installation of Buildings – Code of practice (COP) • Based on latest instruction by regulatory body xii. Occupational Safety & Health Act 514 (OSHA) 1994 xiii. Authorisation requirement to access site such as: <ul style="list-style-type: none"> • Green card • Safety passport 					
		i. Determine procedure to carry out site visit and evaluation ii. Visit and evaluate site location iii. Sketch layout plan iv. Calculate total connected load v. Calculate maximum demand vi. Determine types of three phase wiring vii. Determine types of pro-		12 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		tection devices viii. Determine types of conductor ix. Determine types of cable x. Determine Authorisation requirement to access site	<u>Attitude:</u> i. Meticulous in calculating TCL & MD ii. Adhere to safety regulation			
2. Carry out layout drawing	i. Drawing set ii. Computer Added Drawing software iii. Computer operation iv. Measurement scale technique v. Building layout symbol vi. Application of configuration vii. Electrical symbol, circuit and measurements for layout drawing viii. Electrical accessories and fittings ix. Procedure to draw layout drawing x. Format of layout drawing			8 hours	Lecture	i. Building layout sketched according to specification ii. Three phase wiring configuration determined iii. Types of accessories and fittings determined iv. Layout drawing drew according to requirement and specification v. Layout drawing format checked according to standard format
		i. Acquire drawing set ii. Utilise computer system iii. Utilise drawing software iv. Interpret building layout plan v. Determine electrical symbol vi. Determine electrical accessories/fittings		16 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		vii. Sketch building layout viii. Determine three phase wiring configuration' ix. Determine types of accessories and fittings to be used x. Draw building layout (indoor / outdoor)	<u>Attitude:</u> i. Handle computer with care			
3. Carry out three line / schematic diagram drawing	i. Three line/schematic diagram drawing requirements and specifications as per rules and regulation ii. Devices and cable specification <ul style="list-style-type: none"> • Switches • Protection • Cable • Socket outlet (Switch / Unswitch) iii. Circuit connection method iv. Types of three phase wiring <ul style="list-style-type: none"> • Indoor three phase wiring • Outdoor three phase wiring v. Electrical symbol circuit vi. Procedure to draw three line drawing			8 hours	Lecture	i. Three line drawing requirements and specification determined ii. Devices and cable specification determined iii. Electrical symbol circuit determined iv. Three line drawing drew according to requirement and specification v. Three line drawing format checked according to standard format

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	vii. Format of three line drawing					
		i. Determine electrical symbol ii. Determine electrical accessories and fittings iii. Read and interpret blue print iv. Determine types of three phase wiring protection v. Determine types of accessories and fittings vi. Compare three line drawing to layout drawing vii. Draw electrical three line drawing	<u>Attitude:</u> i. Handle computer with care ii. Adhere to ergonomic requirements	16 hours	Demonstration, Observation & Practical	
4. Carry out three phase wiring drawing	i. Type of accessories ii. Three phase wiring connection, terms and specification iii. Three phase wiring protection iv. Earthing system layout v. Cable size chart vi. Three phase wiring specification and regulation vii. Procedure to draw three phase wiring drawing			8 hours	Lecture	i. Three phase wiring configuration determined ii. Types of accessories and fittings determined iii. Three phase three phase wiring drawing drawn according to requirement and specification iv. Three phase

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	viii. Format of three phase wiring drawing					three phase wiring drawing format checked according to standard format
		i. Read and interpret blue print ii. Determine types of electrical connection iii. Differentiate type of loads iv. Determine types of connection v. Determine type of three phase wiring/accessories and fittings vi. Draw three phase wiring drawing	<u>Attitude:</u> i. Meticulous in drawing	16 hours	Demonstration, Observation & Practical	
5. Inspect three phase drawing	i. Types of drawing ii. Procedure to check drawing error iii. Drawing specification iv. Procedure to check Total Connected Load (TCL) and Maximum Demand (MD) from drawing v. Tender/clients requirements vi. Procedure to submit three phase wiring drawing for approval			6 hours	Lecture	i. Drawing error checked correctly ii. Drawing specification check according to format iii. TCL & MD calculated
		i. Determine types of drawing ii. Check drawing error iii. Check drawing specification against design		12 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		requirements iv. Calculate TCL & MD v. Print out three phase drawing vi. Determine tender / clients requirements vii. Submit three phase wiring drawing for approval to superior vii. Carry out housekeeping activities	<u>Attitude:</u> i. Meticulous in calculation			

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information 01.02 Document information, procedures or processes 02.01 Interpret and follow manuals, instructions and SOP's 02.04 Prepare brief reports and checklist using standard form 02.10 Prepare reports and instruction 02.11 Convey information and ideas to people 03.01 Apply cultural requirements to the workplace 03.05 Demonstrate safety skills 06.02 Comply with and follow chain of command 06.01 Understand system 06.03 Identify and highlight problems	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Multitasking and prioritizing 5. Self-discipline 6. Teamwork 7. Learning skills 8. Leadership skills

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Schematic diagram	1 : 1
2. Block Diagram	1 : 1
3. Measuring Instruments	1 : 1
4. Electrical components/Parts Specification	1 : 1
5. Equipment Data Book	1 : 2
6. Drawing instrument	1 : 1
7. Computer	1 : 1
8. Computer Added Drawing software	1 : 5

References

REFERENCES

1. Undang-Undang Malaysia. 2005. *Akta Bekalan Elektrik 1990 dan Peraturan-Peraturan Elektrik 1994, Pindaan sehingga 2005*. MDC Publisher Sdn Bhd Malaysia.
2. Suruhanjaya Tenaga Malaysia. *Standard Pendawaian Malaysia (Electrical Installations Of Buildings - MS IEC 60364)* Jabatan Standard Malaysia
3. The Institution of Electrical Engineers, 1998, *Peraturan-Peraturan bagi Pemasangan Elektrik, Edisi 16*. Golden Books Centre Sdn Bhd
4. Giesecke, F. E. et. Al. 2002. *Technical Drawing*. Prentice Hall
5. BS 7671: 2001 Requirements for Electrical Installations (IEE Wiring Regulations, Sixteenth Edition) Institution of Electrical Engineers

CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	ELECTRICAL POWER								
Job Area	THREE PHASE ELECTRICAL INSTALLATION & MAINTENANCE								
Competency Unit Title	THREE PHASE WIRING								
Competency Unit Descriptor	Three phase wiring covering the scope of competency to carry out wiring activities for Three phase based on drawing given by utilizing wiring tools, equipment and materials in compliance with Electrical Act 1990, Electrical Regulation 1994 and other related rules and regulations body and statutory requirements. The personnel who are competent in the three phase electrical wiring must be able to interpret three phase wiring specifications and procedures, three phase wiring requirement, carry out wiring activities, earthing system installation and carry out continuity, polarity, insulation and resistance testing on the three phase wiring system.								
Competency Unit Code		Competency Type	Core	Level	3	Training Duration	432	Credit Hours	
Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental		Training Hours	Delivery Mode	Assessment Criteria		
1. Identify three phase wiring specifications and procedures	i. Procedure of site visit and evaluation/survey ii. Technique to produce layout drawing iii. Various type of conductor: <ul style="list-style-type: none"> • Copper • Aluminum iv. Various types of cable: <ul style="list-style-type: none"> • XLPE/SCT/PVC • PVC/PVC • PVC/SWA/PVC • XLPE/SWA/PVC v. Cable colour coding according to MS IEC 60364 Standard vi. Various type of protection devices:				12 hours	Lecture	i. Wiring route and inspection fitting and accessories corrected ii. Correct polarity and connection determined		

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • MCB,MCCB • RCCB/ELCB • Fuse <p>vii. Types of three phase wiring</p> <ul style="list-style-type: none"> • Surface wiring • Conceal wiring • Conduit wiring • Conceal conduit Wiring • Ducting wiring • Trunking/Casing • Cable tray • Underground <p>viii. Suitable fitting and accessories</p> <ul style="list-style-type: none"> • Switches • Power Point (S/S/ 13A) <p>ix. Electrical Act & Regulation and Standard</p> <ul style="list-style-type: none"> • Energy Commission Act 2001 • Electricity Supply Act 1990 (Act 447) • Electrical Regulation 1994 • MS 1936: 2006 / IEC 60364 • MS 1979: 2007 (COP) Electrical Installation of Buildings – Code of practice (COP) 					

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Based on latest instruction by regulatory body x. Occupational Safety & Health Act 514 (OSHA) 1994 xi. Authorisation requirement to access site such as: <ul style="list-style-type: none"> • Green card • Safety passport 					
		<ul style="list-style-type: none"> i. Determine procedure to carry out site visit and evaluation ii. Determine location of the wiring route iii. Determine types of wiring iv. Determine types of protection devices v. Determine types of conductor vi. Determine types of cable vii. Determine suitable fitting and accessories viii. Determine Authorisation requirement to access site 	<p><u>Attitude:</u></p> <ul style="list-style-type: none"> i. Meticulous ii. Housekeeping <p><u>Safety:</u></p> <ul style="list-style-type: none"> i. Use appropriate PPE during carry out wiring practical 	24 Hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			ii. Safety tools & equipment in proper order			
2. Identify three phase wiring tools, equipment and materials	<ul style="list-style-type: none"> i. Three phase Wiring procedure ii. Three phase Wiring preparation iii. Three phase Wiring inspection iv. Wiring tools, equipment and materials 			12 hours	Lecture	<ul style="list-style-type: none"> i. Correct various type of tools used ii. Correct devices cable used
		<ul style="list-style-type: none"> i. Acquire three phase wiring works ii. Select & use three phase wiring tools equipment needed iii. Select & fix electrical accessories iv. Select & fix electrical fittings v. Select wiring tools, equipment and materials 	<p><u>Attitude:</u></p> <ul style="list-style-type: none"> i. Handle wiring tools with care <p><u>Safety:</u></p> <ul style="list-style-type: none"> i. Ensure wiring tools in good working condition 	24 hours	Demonstration, Observation & Practical	
3. Carry out wiring activities	<ul style="list-style-type: none"> i. Electrical hand tools ii. Types of electrical equipment & materials iii. Three phase wiring Standard Operating Procedure iv. Cable marking technique v. Types of cable size and 			12 hours	Lecture	<ul style="list-style-type: none"> i. Wiring activities conducted according to correct procedure ii. Installation and connection wiring identified

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	polarity					iii. All the earthing cable connected to frame earthing correctly
		i. Setup safe working area ii. Conduct three phase wiring according layout plan and location wiring line iii. Identify cable marking iv. Identify cable size & polarity v. Check all fitting & accessories connected to earthing	<u>Attitude:</u> i. Ensure no wastage of cable <u>Safety:</u> i. Use appropriate PPE during wiring activities ii. Ensure safety tools & equipment in proper order	24 hours	Demonstration, Observation & Practical	
4. Carry out three phase earthing system installation	i. Types of earthing ii. Function of earthing iii. Earthing procedure iv. Electrical symbol v. Building structure vi. Electrical hand tools vii. Electrical equipment & materials viii. Electrical earthing accessories & fitting ix. Earthing layout			12 hours	Lecture	i. Three phase earthing system conducted ii. Earthing system tested

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		i. Determine types of earthing ii. Determine function of earthing iii. Install Distribution Fuse Board (DFB) consumer unit to earth rod iv. Connect main frame electrical equipment to earth v. Test earthing system vi. Construct earthing layout	<u>Attitude:</u> i. Ensure no wastage of cable <u>Safety:</u> i. Use appropriate PPE during wiring activities Ensure safety tools & equipment in proper order	24 hours		
5. Carry out three phase Distribution Board (DB)(metallic or insulated) installation	i. Distribution Board (metallic or insulated) ii. Tools and equipment for three phase Distribution Board (metallic or insulated) installation iii. Various method of Consumer surface three phase wiring <ul style="list-style-type: none"> • Domestic Surface wiring • Concealed wiring • Conduit wiring • Trunking wiring 			12 hours	Lecture	i. Neatness of wiring checked ii. Cable terminated consumer unit iii. Cable terminated to fitting and accessories iv. Continuity, polarity, insulation resistance tested

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	iv. Wiring drawing v. Standard Operating Procedures (SOP) for testing instrument vi. Types of electrical system testing, such as:- <ul style="list-style-type: none"> • Insulation resistance test • Polarity test • Continuity test 					
		i. Select and use correct wiring materials ii. Select and use wiring tools and equipment needed iii. Carry out various method of Consumer surface three phase wiring iv. Carry out wiring work according to wiring drawing v. Execute electrical testing on wiring system	<u>Attitude:</u> <ol style="list-style-type: none"> i. Housekeeping working area after wiring activities <u>Safety:</u> <ol style="list-style-type: none"> i. Use appropriate PPE during carry out earthing works ii. Safety tools & equipment in proper order 	24 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
6. Carry out fitting and accessories installation	<ul style="list-style-type: none"> i. Three phase wiring drawing ii. Types of electrical accessories iii. Types of electrical fittings iv. Procedure to terminate cables, accessories and fittings 			12 hours	Lecture	<ul style="list-style-type: none"> i. Cable terminated to fitting and accessories
		<ul style="list-style-type: none"> i. Determine location for fitting and accessories installation ii. Select and fix electrical accessories iii. Select and fix electrical fittings iv. Terminate cables, accessories and fittings 	<p><u>Attitude:</u></p> <ul style="list-style-type: none"> i. Housekeeping working area after wiring activities <p><u>Safety:</u></p> <ul style="list-style-type: none"> i. Use appropriate PPE during carry out installation works ii. Ensure safety tools & equipment in proper order 	24 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
7. Carry out wiring system visual inspection	i. Visual inspection ii. Wiring drawing according to SOP iii. Wiring connection			8 hours	Lecture	i. Visual inspection conducted ii. Fault identified
		i. Execute visual inspection on wiring system ii. Identify fault on visual inspection iii. Carry out housekeeping activities	<u>Attitude:</u> i. Housekeeping working area after wiring activities <u>Safety:</u> i. Use appropriate PPE during carry out installation works ii. Ensure safety tools & equipment in proper order	16 hours	Demonstration, Observation & Practical	
8. Carry out dead circuit test	i. Types of circuit/connection ii. Electrical Testing <ul style="list-style-type: none"> • Insulation resistance test (IRT) • Polarity test • Earthing continuity test • Earthing test <ul style="list-style-type: none"> ○ Earth resistance test ○ Earth loop imped- 			4 hours	Lecture	i. Continuity, polarity, insulation resistance and earthing tested

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	iii. Testing instrument standard operating procedures (SOP) iv. Procedure to interpret testing result					
		i. Determine circuit/connection ii. Execute electrical testing on wiring system iii. Interpret testing result	<u>Attitude:</u> i. Handle testing equipment with care	8 hours	Demonstration, Observation & Practical	
9. Carry out live circuit test	i. ELCB/RCB functioning testing ii. Supply voltage test			4 hours	Lecture	i. ELCB/RCB functioning testing determined ii. Supply voltage tested
		iii. Determine ELCB/RCB functioning testing iv. Test Supply voltage	<u>Attitude:</u> i. Handle testing equipment with care	8 hours	Demonstration, Observation & Practical	
10. Prepare single phase work activities report	i. Procedure to produce three phase wiring ii. Procedure to submit three phase wiring for approval iii. 'As built' drawing preparation iv. Test result v. Regulatory bodies and tender requirements (Form G			6 hours	Lecture	i. Procedure to produce three phase wiring submitted ii. Procedure of three phase wiring reported

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	and Form H)					
		iii. Determine procedure to produce three phase wiring iv. Determine procedure to submit three phase wiring for approval to superior v. Prepare as built drawing vi. Check test result vii. Follow regulatory bodies and tender requirements	<u>Attitude:</u> i. Meticulous in writing report	16 hours	Demonstration, Observation & Practical	

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information 01.02 Document information, procedures or processes 02.01 Interpret and follow manuals, instructions and SOP's 02.04 Prepare brief reports and checklist using standard form 03.01 Apply cultural requirements to the workplace 03.05 Demonstrate safety skills 06.02 Comply with and follow chain of command 06.01 Understand system 06.03 Identify and highlight problems	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Multitasking and prioritizing 5. Self-discipline 6. Teamwork 7. Learning skills 8. Leadership skills

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Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Schematic diagram	1 : 1
2. Block Diagram	1 : 1
3. Measuring and Test Instruments	1 : 1
4. Components/Parts Specification	1 : 1
5. Distribution Boards	1 : 2
6. Trunking Tools	1 : 1
7. Equipment Data Book	1 : 1
8. Electrical Equipment	1 : 1
9. Electrical hand tools	1 : 1
10. Electrical power tools	1 : 1
11. Electrical Mechanical tools	1 : 1
12. Electrical Accessories	1 : 1
13. Electrical Fittings	1 : 1
14. Electrical Testing Instrument	1 : 1
15. Double Insulated cable	1 : 1
16. Wiring lead	1 : 1
17. Wiring neil	1 : 1
18. Cables	1 : 1
19. PVC Tape	1 : 1
20. Standard Operating Procedure	

References

REFERENCES

1. Undang-Undang Malaysia. 2005. *Akta Bekalan Elektrik 1990 dan Peraturan-Peraturan Elektrik 1994, Pindaan sehingga 2005*. MDC Publisher Sdn Bhd Malaysia.
2. Suruhanjaya Tenaga Malaysia. *Standard Pendawaian Malaysia (Electrical Installations Of Buildings - MS IEC 60364)* Jabatan Standard Malaysia
3. The Institution of Electrical Engineers, 1998, *Peraturan-Peraturan bagi Pemasangan Elektrik, Edisi 16*. Golden Books Centre Sdn Bhd
4. Giesecke, F. E. et. Al. 2002. *Technical Drawing*. Prentice Hall
5. BS 7671: 2001 Requirements for Electrical Installations (IEE Wiring Regulations, Sixteenth Edition) Institution of Electrical Engineers

CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	ELECTRICAL POWER								
Job Area	THREE PHASE ELECTRICAL INSTALLATION & MAINTENANCE								
Competency Unit Title	THREE PHASE WIRING MAINTENANCE								
Competency Unit Descriptor	Three phase wiring is a list of maintenance activity to carry out maintenance work on wiring system for Three phase based drawing given by utilizing wiring tools, equipment and materials in compliance with Electrical Act 1990, Electrical Regulation 1994 and other related rules and regulations body and statutory requirements. The personnel who are competent in the three phase electrical wiring maintenance must be able to interpret three phase wiring diagram, carry out electrical wiring inspection and maintenance and to conduct continuity, polarity, insulation resistance and earthing resistance testing								
Competency Unit Code		Competency Type	Core	Level	3	Training Duration	72	Credit Hours	
Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental		Training Hours	Delivery Mode	Assessment Criteria		
1. Identify three phase wiring maintenance re-requirement	i. Types of maintenance activities <ul style="list-style-type: none"> • Preventive • Corrective ii. Types of fault for three phase wiring <ul style="list-style-type: none"> • Shorted • Open • Loose iii. Types of schematic diagram for three phase wiring iv. Procedure to carry out three phase wiring maintenance v. Procedure to carry out site visit vi. Electrical Act & Regulation and Standard <ul style="list-style-type: none"> • Energy Commission Act 2001 				2 hours	Lecture	i. Three phase wiring fault listed out ii. Schematic diagram determined		

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Electricity Supply Act 1990 (Act 447) • Electrical Regulation 1994 • MS 1936: 2006 / IEC 60364 • MS 1979: 2007 (COP) • Electrical Installation of Buildings – Code of practice (COP) • Based on latest instruction by regulatory body <p>viii. Occupational Safety & Health Act 514 (OSHA) 1994</p> <p>ix. Authorisation requirement to access site such as:</p> <ul style="list-style-type: none"> • Green card • Safety passport 					
		<p>i. Determine types of maintenance activities</p> <p>ii. Determine types of fault for three phase wiring</p> <p>iii. Determine schematic diagram three phase wiring</p> <p>iv. Visit site to determine maintenance requirement</p> <p>v. Determine procedure to carry out three phase wiring</p>	<i>Attitude:</i>	4 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			Adhere the procedure and instruction according operational manual			
2. Identify three phase wiring tool, equipment and material	<ul style="list-style-type: none"> i. Wiring tools and equipment ii. Types of electrical cable for three phase iii. Types of electrical equipment and accessories iv. Electrical testing instrument v. Calibration requirement for electrical testing instrumentation 			2 hours	Lecture	i. Tools, equipment and material of wiring identified
		<ul style="list-style-type: none"> i. Acquire wiring tools and equipment ii. Determine types of electrical cable for three phase iii. Determine types of electrical equipment and accessories iv. Determine types of electrical testing instrument v. Determine calibration requirement for electrical testing instrumentation 	<u>Attitude:</u> <ul style="list-style-type: none"> i. Meticulous in interpreting calibration certificate ii. Handle wiring tools, equipment 	4 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			<p>and testing tools with care</p> <p><u>Safety:</u></p> <p>i. Ensure tools and equipment in good working condition</p>			
3. Carry out electrical wiring inspection	<p>i. Interpreting three phase wiring schematic diagram</p> <p>ii. Procedure to carry out inspection</p> <p>iii. Three phase electrical wiring fault</p>			2 hours	Lecture	<p>i. Electrical wiring inspected</p> <p>ii. Electrical wiring fault according specification inspected</p>
		<p>i. Interpret schematic diagram</p> <p>ii. Utilise testing tools and equipment</p> <p>iii. Inspect electrical wiring</p> <p>iv. Confirm three phase electrical wiring fault</p>	<p><u>Attitude:</u></p> <p>i. Check thoroughly for electrical fault</p> <p><u>Safety:</u></p> <p>i. Use appropriate PPE (glove, goggle, safety boot) during carry out wiring inspection activity</p> <p>ii. Check safety tools & equipment in proper order</p>	6 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
4. Carry out electrical wiring maintenance	i. Procedures to rectify electrical three phase wiring fault ii. Three phase electrical wiring faulty part iii. Tools, equipment and material of three phase wiring iv. Testing and commissioning procedures for three phase wiring system v. Testing method and procedures <ul style="list-style-type: none"> • Short • Long 			2 hours	Lecture	i. Electrical wiring faulty part replaced ii. Tools and equipment utilised
		i. Determined procedure of electrical three phase wiring fault ii. Select tools, equipment and material iii. Interpret schematic drawing iv. Test troubleshoot three phase electrical wiring faulty v. Repair and replace faulty part vi. Perform functionality testing vii. Used testing equipment/tools viii. Interpret test result ix. Utilise multimeter or Direct		4 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		Current (DC) test lamp	<u>Attitude:</u> i. Neatness ii. Housekeeping <u>Safety:</u> i. Use appropriate PPE (glove, goggle, safety boot)during carry out wiring practical ii. Safety tools & equipment in proper order iii. Display safety sign board iv. Lock main switch v. Ensure 'OFF live supply			
5. Inspect electrical wiring functionality	i. Various testing and measuring instruments ii. Types and application and protection devices iii. Types of testing <ul style="list-style-type: none"> • Continuity • Polarity • Insulation • Earthing iv. Specification technical data v. Operation manual			2 hours	Lecture	i. Continuity, polarity, insulation resistance and earthing resistance tested

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		i. Select testing and measuring instruments ii. Check Protection devices iii. Conduct continuity testing iv. Conduct polarity testing v. Conduct insulation testing vi. Conduct earthing testing vii. Collect and record the result viii. Carry out housekeeping activities	<u>Attitude:</u> i. Adhere the procedure and instruction according operational manual <u>Safety:</u> i. Use appropriate PPE (glove, goggle, safety boot)during carry out wiring activities ii. Safety tools & equipment in proper order iii. Adhere to maintenance procedure iv. Adhere to Code of ethics	4 hours	Demonstration, Observation & Practical	
6. Record wiring system maintenance activities	i. Recording procedure ii. Record format/form testing iii. Schedule maintenance iv. Report writing skills			2 hour	Lecture	i. Checklist, logbook and schedule maintenance report submitted

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		i. Record checklist, logbook and schedule maintenance report ii. Prepare three phase wiring maintenance report	<u>Attitude:</u> i. Neatness ii. Meticulous in writing report	2 hours	Demonstration, Observation & Practical	

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information 01.02 Document information, procedures or processes 02.01 Interpret and follow manuals, instructions and SOP's 02.04 Prepare brief reports and checklist using standard form 03.01 Apply cultural requirements to the workplace 03.05 Demonstrate safety skills 06.02 Comply with and follow chain of command 06.01 Understand system 06.03 Identify and highlight problems	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Multitasking and prioritizing 5. Self-discipline 6. Teamwork 7. Learning skills 8. Leadership skills

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Schematic diagram	1 : 1
2. Block Diagram	1 : 1
3. Measuring and Test Instruments	1 : 1
4. Components/Parts Specification	1 : 1
5. Distribution Boards	1 : 2
6. Trunking Tools	1 : 1
7. Equipment Data Book	1 : 1
8. Electrical Equipment	1 : 1
9. Electrical Mechanical tools	1 : 1
10. Electrical hand tools	1 : 1
11. Electrical power tools	1 : 1
12. Electrical Accessories	1 : 1
13. Electrical Fittings	1 : 1
14. Electrical Testing Instrument	1 : 1
15. Double Insulated cable	1 : 1
16. Wiring lead	1 : 1
17. Wiring neil	1 : 1
18. Cables	1 : 1
19. PVC Tape	1 : 1
20. Standard Operating Procedure	

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CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	ELECTRICAL POWER								
Job Area	THREE PHASE ELECTRICAL INSTALLATION & MAINTENANCE								
Competency Unit Title	THREE PHASE MOTOR & MOTOR CONTROL INSTALLATION								
Competency Unit Descriptor	Three phase motor and motor control installation is an activity that covers the competency requirements for the installation of Three phase motor and motor control based on installation specification and procedures in accordance with Electrical Act 1990, Electrical Regulation 1994 and other related rules and regulations body and statutory requirements. The personnel who are competent in the three phase motor and motor control must be able to interpret installation manuals and procedures, carry out three phase motor and motor control installation, inspect three phase motor and motor control functionality and to conduct continuity, polarity, insulation resistance and earthing resistance testing.								
Competency Unit Code		Competency Type	Core	Level	3	Training Duration	288	Credit Hours	
Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria			
1. Identify three phase motor & motor control installation specifications and procedures	i. Types of three phase motor <ul style="list-style-type: none"> • Squirrel cage induction motor • Capacitor start • Capacitor run • Repulsion motor • Shaded poles • Universal motor • Synchronous motor ii. Types of three phase motor control <ul style="list-style-type: none"> • Forward Reverse • Direct Online (DOL) • Star Delta (SD) • Auto Transformer(AT) • Slip Ring – Rotor Resistor Starter • Other Stater 			6 hours	Lecture	i. Installation three phase motor & motor control according requirements ii. All specification and requirements follow manufacturing manual/handbook			

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	iii. Three phase motor main control components and accessories iv. Three phase control circuit components and accessories v. Magnetic contactor and overload relay vi. Electrical Act & Regulation and Standard <ul style="list-style-type: none"> • Energy Commission Act 2001 • Electricity Supply Act 1990 (Act 447) • Electrical Regulation 1994 • MS 1936: 2006 / IEC 60364 • MS 1979: 2007 (COP) • Electrical Installation of Buildings – Code of practice (COP) • Based on latest instruction by regulatory body vii. Occupational Safety & Health Act 514 (OSHA) 1994 viii. Authorisation requirement to access site such as: <ul style="list-style-type: none"> • Green card • Safety passport 					
		i. Determine three phase motor ii. Determine three phase motor control		12 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		iii. Determine three phase motor main components and accessories iv. Determine three phase control circuit components and accessories ix. Determine magnetic contactor and overload relay as required	<u>Attitude:</u> i. Adhere the procedure and instruction according operational manual			
2. Prepare three phase motor and motor control installation, maintenance, tools, equipment and materials	i. Three line drawing <ul style="list-style-type: none"> • Main circuit • Control circuit • Protection devices ii. Location of motor & motor control installation devices including <ul style="list-style-type: none"> • Platform structure • Underwater • Surface • Weather proof • Protection devices • Sensing devices <ul style="list-style-type: none"> ○ Timer ○ Thermal ○ Limit ○ Flow ○ Latching relay iii. Three phase motor & motor			8 hours	Lecture	i. Motor & motor control installation including devices allocated ii. Selection of sensing devices used at corrected installation

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	iv. control maintenance <ul style="list-style-type: none"> • Periodically check • Preventive maintenance • Corrective maintenance v. Three phase motor & motor control installation tools, equipment and materials vi. Three phase motor & motor control testing equipment <ul style="list-style-type: none"> • LCR meter • Rotation meter • Multimeter • Insulation tester meter 					
		i. Select three line drawing ii. Select location of motor & motor control installation devices iii. Determine three phase motor & motor control maintenance iv. Select three phase motor & motor control tools v. Select three phase motor & motor control testing equipment	<u>Attitude:</u> i. Housekeeping <u>Safety:</u> i. Comply to rules and regulation	16 hours	Demonstration, Observation & Practical	
3. Carry out three phase motor installation	i. Schematic diagram ii. Three phase motor symbol iii. Main & control circuit iv. Motor sizing & rating			6 hours	Lecture	i. Selection drawing suitable with the requirements and location

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> v. Installation procedure vi. Control panel accessories vii. Functionality of circuit 					<ul style="list-style-type: none"> ii. Fault rectified and repaired iii. Circuit tested
		<ul style="list-style-type: none"> i. Read and interpret schematic drawing ii. Identify motor size and rating iii. Identify types of motor components and accessories iv. Install three phase motor and motor control v. Testing the circuit vi. Repair the three phase motor fault 	<p><u>Attitude:</u></p> <ul style="list-style-type: none"> i. Meticulous in read and interpret diagram <p><u>Safety:</u></p> <ul style="list-style-type: none"> i. Use PPE properly ii. Adhere to electrical Act & regulation 	14 hours	Demonstration, Observation & Practical	
4. Carry out three phase motor control termination	<ul style="list-style-type: none"> i. Installation termination & connection ii. Types of circuit/connection iii. Type of load/connection iv. Accessories connection, fittings and function of tools v. Operation of hand tools and 			4 hours	Lecture	<ul style="list-style-type: none"> i. Installation, termination & circuit connection, ensured fixed ii. Platform in good stability and fixed firm

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			iv. (OSHA) Used a proper hand tools			
5. Inspect three phase motor and motor control functionality	i. Types and application of protection devices ii. Types of testing <ul style="list-style-type: none"> • Insulation • Continuity • Polarity • Earthing iii. Specification technical data iv. Operation manual			6 hours	Lecture	i. Continuity, polarity, insulation resistance and earthing resistance tested
		i. Determine testing and measurement instruments ii. Check Protection devices iii. Conduct insulation test iv. Conduct continuity test v. Conduct polarity test vi. Conduct earthing test vii. Conduct motor test run (on load and off load) viii. Collect and record the data ix. Carry out housekeeping activities	<u>Attitude:</u> i. Meticulous in read and record data <u>Safety:</u> i. Use PPE properly ii. Comply electrical Act & regulation	12 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			<ul style="list-style-type: none"> iii. Comply Act 514 (OSHA) iv. Used a proper hand tools v. Adhere maintenance procedure vi. Code of ethics 			
6. Record three phase motor and motor control installation.	<ul style="list-style-type: none"> i. Recording procedure ii. Test record format/form iii. Report writing skills 			2 hours	Lecture	i. Checklist, logbook and schedule maintenance report submitted
		<ul style="list-style-type: none"> i. Compile three phase motor and motor control maintenance data ii. Prepare three phase motor and motor control installation report 	<u>Attitude:</u> <ul style="list-style-type: none"> i. Neatness ii. Meticulous in writing report 	4 hours	Demonstration, Observation & Practical	

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information 01.02 Document information, procedures or processes 02.01 Interpret and follow manuals, instructions and SOP's 02.04 Prepare brief reports and checklist using standard form 03.01 Apply cultural requirements to the workplace 03.05 Demonstrate safety skills 06.02 Comply with and follow chain of command 06.01 Understand system 06.03 Identify and highlight problems	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Multitasking and prioritizing 5. Self-discipline 6. Teamwork 7. Learning skills 8. Leadership skills

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Schematic diagram	1 : 1
2. Block Diagram	1 : 1
3. Measuring and Test Instruments	1 : 1
4. Components/Parts Specification	1 : 1
5. Distribution Boards	1 : 2
6. Trunking Tools	1 : 1
7. Equipment Data Book	1 : 1
8. Electrical Equipment	1 : 1
9. Electrical hand tools	1 : 1
10. Electrical Mechanical tools	1 : 1
11. Electrical power tools	1 : 1

12. Electrical Accessories	1 : 1
13. Electrical Fittings	1 : 1
14. Electrical Testing Instrument	1 : 1
15. Double Insulated cable	1 : 1
16. Wiring lead	1 : 1
17. Wiring neil	1 : 1
18. Cables	1 : 1
19. PVC Tape	1 : 1
20. Standard Operating Procedure	1 : 1

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3.	Suruhanjaya Tenaga Malaysia. <i>Standard Pendawaian Malaysia (Electrical Installations Of Buildings - MS IEC 60364)</i> Jabatan Standard Malaysia
4.	The Institution of Electrical Engineers, 1998, <i>Peraturan-Peraturan bagi Pemasangan Elektrik, Edisi 16</i> . Golden Books Centre Sdn Bhd

CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	ELECTRICAL POWER								
Job Area	THREE PHASE ELECTRICAL INSTALLATION & MAINTENANCE								
Competency Unit Title	THREE PHASE ELECTRICAL APPLIANCES MAINTENANCE								
Competency Unit Descriptor	Electrical appliances maintenance is a set of competency to carry out repair work and maintenance on electrical appliances faulty by referring to appliances service manual and standard operating procedures and in compliances with Electrical Act 1990, Electrical Regulation 1994 and other related rules and regulations body and statutory requirements. The personnel who are competent in the electrical appliances maintenance must be able to identify appliances specification and manuals, carry out maintenance activities and to conduct polarity, insulation, resistance and earthing resistance testing in accordance with manufacturer's specification requirements.								
Competency Unit Code		Competency Type	Core	Level	3	Training Duration	72	Credit Hours	
Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental		Training Hours	Delivery Mode	Assessment Criteria		
1. Identify electrical appliances maintenance requirement, specification and manuals	i. Types of home appliances, such as; <ul style="list-style-type: none"> • Microwave • Oven • Iron • Lamp • Three phase Air Conditioning • Water Heater • Refrigerator • Three phase motor ii. Types of electrical appliances fault <ul style="list-style-type: none"> • Short circuit • Open circuit • Loose contact • Board faulty 				4 hours	Lecture	i. Three phase wiring fault listed out ii. Schematic diagram determined iii. Visual on the board checked		

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	iii. Types of schematic diagram iv. Electrical Act & Regulation and Standard <ul style="list-style-type: none"> • Energy Commission Act 2001 • Electricity Supply Act 1990 (Act 447) • Electrical Regulation 1994 • MS 1936: 2006 / IEC 60364 • MS 1979: 2007 (COP) • Electrical Installation of Buildings – Code of practice (COP) • Based on latest instruction by regulatory body viii. Occupational Safety & Health Act 514 (OSHA) 1994 ix. Authorisation requirement to access site such as: <ul style="list-style-type: none"> • Green card • Safety passport x. Standard & Industrial Research Institute of Malaysia (SIRIM)					
		i. Determine types of home appliances fault ii. Interpret schematic diagram iii. Determine electrical appliances fault iv. Adhere standard of		12 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		SIRIM	<u>Attitude:</u> i. Proactive in obtaining manufacturer's specification and operation manual			
3. Prepare three phase electrical appliances maintenance tools, equipment and materials	i. Wiring tools, equipment and materials ii. Types of electrical cable for three phase iii. Types of electrical equipment and accessories iv. Electrical testing instrument v. Calibration requirement for electrical testing instrumentation vi. Electrical appliances manufacturer's specification and operation manual			4 hours	Lecture	i. Tools, equipment and material selected ii. Electrical appliances faulty part fixed according requirements
		i. Acquire maintenance tools, equipment and materials ii. Determine types of electrical cable for three phase electrical appliance iii. Determine types of electrical testing instrument iv. Determine calibration requirement for electrical testing instrumentation vii. Obtain electrical appliances manufacturer's specification and operation manual	<u>Attitude:</u> i. Handle equipment with care ii. Peruse the man-	12 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			<p>ufacturer's specification and operation manual manual for the</p> <p><u>Safety:</u></p> <ul style="list-style-type: none"> i. Meticulous in interpreting calibration certificate ii. Handle wiring tools, equipment and testing tools with care iii. Ensure tools and equipment in good working condition 			
4. Carry out electrical appliances inspection	<ul style="list-style-type: none"> i. Schematic diagram ii. Procedure to inspect three phase electrical appliances condition 			4 hours	Lecture	<ul style="list-style-type: none"> i. Electrical appliances inspected ii. Electrical appliances fault recorded according specification
		<ul style="list-style-type: none"> i. Interpret schematic diagram ii. Utilise tools, equipment and material iii. Inspect electrical appliance condition iv. Confirm electrical appliances fault v. Interpret three phase electrical appliances manufacturer's manual vi. Carry out housekeeping activities 		12 hours	Demonstration, Observation & Practical	<ul style="list-style-type: none"> iii. Electrical appliances fault determined iv. Performance verification tested
			<u>Attitude:</u>			

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			i. Thoroughly in inspecting faulty <u>Safety:</u> i. Used appropriate PPE ii. Comply to rules and regulation iii. Use tools, equipment and material properly			
5. Carry out electrical appliances maintenance	i. Procedures to rectify electrical appliances fault ii. Electrical appliances faulty part iii. Select tools, equipment and material for maintenance work iv. Schematic drawing v. Procedure to acquire spare parts for electrical appliance vi. Various testing and measuring instruments vii. Types and application and protection devices viii. Types of testing <ul style="list-style-type: none"> • Insulation • Continuity • Polarity • Earthing ix. Specification technical data x. Operation manual for three phase electrical appliances			6 hours	Lecture	i. Electrical appliance faulty part replaced ii. Tools and equipment utilized iii. Testing and commissioning tested iv. Continuity, polarity, insulation resistance and earthing resistance tested v. Checklist, logbook and schedule maintenance report submitted

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		<ul style="list-style-type: none"> i. Select tools, equipment and material used for maintenance activities ii. Interpret schematic drawing iii. Troubleshoot electrical appliances faulty iv. Obtain electrical appliances spare parts v. Rectify and replace faulty part vi. Execute functionality testing vii. Interpret test result viii. Select testing and measuring instruments ix. Check protection devices x. Conduct insulation testing xi. Conduct continuity testing xii. Conduct polarity testing xiii. Conduct earthing testing xiv. Collect and record maintenance result for three phase electrical appliances 	<p><u>Attitude:</u></p> <ul style="list-style-type: none"> i. Proactive in maintenance work <p><u>Safety:</u></p> <ul style="list-style-type: none"> i. Used appropriate PPE ii. Comply to rules and regulation iii. Used tools, equipment and material properly iv. Display safety 	18 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			sign board v. Lock main switch vi. Ensure 'OFF live supply vii. Handle care spare part and install correctly			

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information 01.02 Document information, procedures or processes 02.01 Interpret and follow manuals, instructions and SOP's 02.04 Prepare brief reports and checklist using standard form 03.01 Apply cultural requirements to the workplace 03.05 Demonstrate safety skills 06.02 Comply with and follow chain of command 06.01 Understand system 06.03 Identify and highlight problems	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Multitasking and prioritizing 5. Self-discipline 6. Teamwork 7. Learning skills 8. Leadership skills

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Schematic diagram	1 : 1
2. Block Diagram	1 : 1
3. Measuring and Test Instruments	1 : 1
4. Components/Parts Specification	1 : 1
5. Distribution Boards	1 : 2
6. Trunking Tools	1 : 1
7. Equipment Data Book	1 : 1
8. Electrical Equipment	1 : 1
9. Electrical Mechanical tools	1 : 1
10. Electrical hand tools	1 : 1
11. Electrical power tools	1 : 1
12. Electrical Accessories	1 : 1
13. Electrical Fittings	1 : 1
14. Electrical Testing Instrument	1 : 1
15. Double Insulated cable	1 : 1
16. Wiring materials	1 : 1
17. Cables	1 : 1
18. PVC Tape	1 : 1

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CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	ELECTRICAL POWER								
Job Area	THREE PHASE ELECTRICAL INSTALLATION & MAINTENANCE								
Competency Unit Title	THREE PHASE WIRING TESTING AND COMMISSIONING								
Competency Unit Descriptor	Three phase wiring testing & commissioning is a competency to carry out testing and inspection on Three phase wiring system for the purpose of commissioning the wiring system according to Electrical Act 1990, Electrical Regulation 1994 and other related rules and regulations body and statutory requirements. The personnel who are competent in the three phase electrical wiring must be able to identify three phase testing and commissioning specifications and procedures, carry out electrical testing including resistance testing, polarity testing, continuity testing, earthing testing and carry out commissioning on the wiring system								
Competency Unit Code		Competency Type	Core	Level	3	Training Duration	72	Credit Hours	
Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria			
1. Identify three phase testing and commissioning specifications and procedures	i. Procedure of site visit evaluation. ii. Three phase schematic diagram iii. Technique to conduct testing and commissioning on three phase electrical wiring. iv. Types of testing <ul style="list-style-type: none"> • Insulation • Polarity • Continuity • Earthing v. Types of testing tool and equipment for three phase wiring vi. Type of testing and commissioning form for three phase wiring vii. Safety regulation bodies			2 hour	Lecture	i. Schematic diagram of three phase electrical wiring determined ii. Testing for Three phase wiring listed out iii. Testing of resistance test tool and equipment listed out. iv. Testing of polarity test tool and equipment listed out v. Testing of continuity test tool and equipment listed out vi. Testing of earthing test tool and equipment			

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	viii. Electrical Act & Regulation and Standard <ul style="list-style-type: none"> • Energy Commission Act 2001 • Electricity Supply Act 1990 (Act 447) • Electrical Regulation 1994 • MS 1936: 2006 / IEC 60364 • MS 1979: 2007 (COP) • Electrical Installation of Buildings – Code of practice (COP) • Based on latest instruction by regulatory body ix. Occupational Safety & Health Act 514 (OSHA) 1994 x. Authorisation requirement to access site such as: <ul style="list-style-type: none"> • Green card • Safety passport 					listed out vii. Tools, equipment and material selected viii. Testing and commissioning form identified
		i. Carry out site visit for evaluation ii. Interpret three phase schematic diagram iii. Determine types of testing iv. Determine testing equipment v. Determine testing tools and equipment for three phase wiring		4 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		vi. Determine testing and commissioning form for three phase vii. Comply Safety regulation bodies viii. Determine Authorisation requirement to access site	<u>Attitude:</u> i. Housekeeping			
3. Prepare three phase testing and commissioning tools, equipment and materials	i. Three phase Schematic diagram ii. Tools, equipment and materials used for three phase testing and commissioning tools, equipment and materials iii. Procedure to obtain commissioning form			2 hours	Lecture	i. Testing tools utilise according to correct method ii. Method of testing technique testing tools and equipment correctly applied iii. Tools, equipment and materials listed out.
		i. Interpret schematic diagram ii. Carry out preparation tools, equipment and material for testing and commissioning activities iii. Identify electrical circuit in the three phase wiring iv. Confirm electrical circuit in the three phase wiring.	<u>Attitude:</u> i. Handle equipment with care	6 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
4. Carry out three phase insulation resistance testing	<ul style="list-style-type: none"> i. Procedures to carry out three phase insulation resistance test. ii. Polarity tools, equipment and material iii. Testing data, method and procedure 			4 hours	Lecture	<ul style="list-style-type: none"> i. Insulation resistance test carried out correctly ii. Tools and equipment utilized iii. Insulation resistance testing correctly executed
		<ul style="list-style-type: none"> i. Determine tools, equipment and material ii. Execute insulation resistance testing iii. Utilise testing tools, equipment and material iv. Record testing data v. Interpret test result 	<p><u>Attitude:</u></p> <ul style="list-style-type: none"> i. Handle testing equipment with care <p><u>Safety:</u></p> <ul style="list-style-type: none"> i. Used appropriate PPE ii. Used tools, equipment and material properly 	6 hours	Demonstration, Observation & Practical	
5. Carry out three phase polarity testing	<ul style="list-style-type: none"> i. Procedures to carry out three phase polarity test. ii. Polarity test tools, equipment and material iii. Testing method and procedures 			4 hours	Lecture	<ul style="list-style-type: none"> i. Polarity test carried out ii. Tools and equipment utilized iii. Testing of polarity tested as per proce-

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		i. Determine tools, equipment and material ii. Execute polarity testing iii. Utilise testing tools iv. Record testing data v. Interpret test result vi. Rectify / Coordinate rectification work for non-compliance test result	<u>Attitude:</u> i. Handle testing equipment with care <u>Safety:</u> i. Used appropriate PPE ii. Used tools, equipment and material properly	8 hours	Demonstration, Observation & Practical	dure
6. Carry out three phase continuity testing	i. Procedures to carry out three phase continuity test. ii. Continuity test tools, equipment and material iii. Testing method and procedures			4 hours	Lecture	i. Three phase continuity testing carried out as per testing standard ii. Tools, equipment and material for testing listed out iii. Testing method and procedures complied
		i. Determine tools, equipment and material ii. Execute continuity testing iii. Utilise testing equipment/tools iv. Record testing data v. Interpret testing result vi. Rectify / Coordinate rectification work for non-compliance test result		8 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			<u>Attitude:</u> i. Handle testing equipment with care <u>Safety:</u> i. Used appropriate PPE ii. Used tools, equipment and material properly			
7. Carry out three phase earthing resistance testing	i. Procedures to carry out three phase earthing resistance test. ii. Select tools, equipment and material iii. Testing method and procedures			4 hours	Lecture	i. Procedures to carry out three phase earthing resistance test complied ii. Tools, equipment and material list out iii. Testing method and procedures complied
		i. Determine tools, equipment and material determined ii. Execute earthing resistance testing iii. Utilise testing equipment/tools iv. Utilise earth resistance test meter v. Interpret test result	<u>Attitude:</u> i. Handle testing equipment with care <u>Safety:</u> i. Used appropriate PPE ii. Used tools, equipment and material properly	6 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
8. Carry out testing commissioning	<ul style="list-style-type: none"> i. Three phase wiring test and commissioning procedure ii. Three phase electrical test and commissioning documentation. iii. Testing record iv. Testing and commissioning requirement 			2 hours	Lecture	<ul style="list-style-type: none"> i. Procedures to commissioning of three phase electrical wiring followed ii. Testing method and procedures followed
		<ul style="list-style-type: none"> i. Determine tools, equipment and material ii. Determine commissioning form for testing three phase electrical wiring iii. Determine testing result iv. Refer to standard limit of testing need to three phase electrical wiring. v. Interpret test and commissioning result vi. Update commissioning form 	<p><u>Attitude:</u></p> <ul style="list-style-type: none"> i. Meticulous in fill in commissioning form 	6 hours	Demonstration, Observation & Practical	
9. Prepare testing and commissioning report	<ul style="list-style-type: none"> i. Procedure to collect and gathered all testing result ii. Standard form for testing and commissioning report iii. Report writing skills 			2 hour	Lecture	<ul style="list-style-type: none"> iii. Procedures to prepare report for testing and commissioning three phase electrical wiring followed
		<ul style="list-style-type: none"> i. Compile testing and commissioning result ii. Prepare commissioning 		4 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		document for approval iii. Write testing and commissioning report iv. Submit testing and commissioning report to superior	<u>Attitude:</u> i. Meticulous in preparing report ii. Adhere to report submission dateline			

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information 01.02 Document information, procedures or processes 02.01 Interpret and follow manuals, instructions and SOP's 02.04 Prepare brief reports and checklist using standard form 03.01 Apply cultural requirements to the workplace 03.05 Demonstrate safety skills 06.02 Comply with and follow chain of command 06.01 Understand system 06.03 Identify and highlight problems	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Multitasking and prioritizing 5. Self-discipline 6. Teamwork 7. Learning skills 8. Leadership skills

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Schematic diagram 2. Block Diagram 3. Measuring and Test Instruments 4. Components/Parts Specification 5. Equipment Data Book	1:1 1:1 1:1 1:1 1:2

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6.

CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	ELECTRICAL POWER									
Job Area	THREE PHASE ELECTRICAL INSTALLATION & MAINTENANCE									
Competency Unit Title	SUPERVISORY FUNCTION									
Competency Unit Descriptor	Supervisory function is a list of competency for personnel in their field of work to supervise and coordinate work implementation according to their working environment and adhering to company policies, procedure, rules and regulations. The personnel who are competent in the supervisory function must be able to monitor work progress, conduct section briefing, carry out staff training, provide appraisal accommodation, implement safety measures, carry out customer and inter departmental liaison, prepare section budget, prepare technical report									
Competency Unit Code		Competency Type	Core	Level	3	Training Duration	110	Credit Hours		
Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria				
1. Monitor work progress	<ul style="list-style-type: none"> i. Procedure to prepare work schedule ii. Organization chart iii. Staff job function iv. Procedure to distribute work schedule v. Procedure to monitor work schedule 			3 hours	Lecture	<ul style="list-style-type: none"> i. Work schedule prepared correctly ii. Staff job function interpreted list out correctly 				
		<ul style="list-style-type: none"> i. Prepare work schedule ii. Determine job function iii. Determine to distribute work schedule iv. Determine to monitor work schedule v. Check work performance against work schedule 		10 hours	Demonstration, Observation & Practical		<u>Attitude:</u> <ul style="list-style-type: none"> i. Ensure schedule is prepared according to dateline 			

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			ii. Ensure planning and work schedule regularly check			
2. Conduct section briefing	i. Topic for briefing ii. Briefing information iii. Target audience iv. Communication skill			3 hours	Lecture	i. Briefing information prepared correctly ii. Briefing carry out effectively
		i. Determine briefing topic ii. Compile briefing information iii. Convey information to staff	<u>Attitude:</u> i. Communicate effectively ii. Ensure briefing content prepare before conducting staff briefing	10 hours	Demonstration, Observation & Practical	
3. Carry out staff training	i. Type of training such as: • On Job Training- exposure program ii. Supervisory, mentoring and coaching iii. Types of training materials iv. Motivating and counseling skill v. Presentation and demonstration skill			3 hours	Lecture	i. Types of training determined correctly according to staff training needs ii. Training material list out correctly

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		i. Determine types of training ii. Compile types of training materials iii. Present training content iv. Demonstrate practical skill	<u>Attitude:</u> i. Meticulous in recording staff disciplinary form	10 hours	Demonstration, Observation & Practical	
4. Provide appraisal accommodation	i. Types of staff appraisal ii. Staff records iii. Personnel appraisal form iv. Work evaluation skill			3 hours	Lecture	i. Types of staff appraisal method determined correctly ii. Staff record interpreted iii. Personnel appraisal form filled in according to procedure iv. Staff performance appraised as per checklist
		i. Determine types of appraisal method ii. Acquire staff records iii. Acquire personnel appraisal form iv. Appraise staff performance	<u>Attitude:</u> i. Appraise staff for fair manner	10 hours	Demonstration, Observation & Practical	
5. Implement safety measures	i. Type of hazards ii. Procedures for first aid iii. Types of safety equipment			3 hours	Lecture	i. Types of hazard listed out ii. Procedures of first aid applied correctly

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> iv. Occupational Safety & Health Act v. Application of first aid kit vi. Various type of accident 					<ul style="list-style-type: none"> iii. Types of safety equipment listed out correctly iv. Application of first aid kit determined correctly
		<ul style="list-style-type: none"> i. Determine types of hazard ii. Apply procedures of first aid iii. Determine types of safety equipment iv. Adhere Occupational Safety & Health Act v. Determine application of first aid kit vi. Determine types of accident 	<p><u>Attitude:</u></p> <ul style="list-style-type: none"> i. Ensure first aid kit check for expired date and fill according to requirement 	10 hours	Demonstration, Observation & Practical	
6. Carry out customer and inter departmental liaison	<ul style="list-style-type: none"> i. Communication skill ii. Types of correspondence activities iii. Organization chart iv. Procedure to handle customer complaint 			3 hours	Lecture	<ul style="list-style-type: none"> i. Liaison procedure listed out according to company procedure ii. Customer profile interpreted iii. Types of correspondence activities determined iv. Customer complaints handled according to company procedure
		<ul style="list-style-type: none"> i. Determine liaison activities procedure ii. Determine customer profile iii. Determine types of correspondence activities 		10 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		iv. Apply procedure to handle customer complaint	<u>Attitude:</u> i. Adhere to company procedure for liaison activities			
7. Prepare section budget	i. Budgetary procedures ii. Expenditure report iii. Financial report iv. Type of section revenue			3 hours	Lecture	i. Briefing data information prepared ii. Unit of briefing conducted iii. Company budgetary procedures listed out iv. Section's expenditure report interpreted correctly v. Section expenditure estimated correctly vi. Section revenue anticipated correctly according to sales target
		i. Determine budgetary procedures ii. Interpret current section's expenditure report iii. Determine type of section revenue iv. Estimate section expenditure v. Anticipate section revenue vi. Produce section budget forecast report	<u>Attitude:</u> i. Ensure all section expenditure calculated correctly	10 hours	Demonstration, Observation & Practical	
8. Prepare technical report	i. Procedure to write report ii. Organization chart iii. Types of report iv. Various type of report			3 hours	Lecture	i. Procedure to write report listed out ii. Report format determined

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	format v. Writing skill vi. Presentation skill					correctly according to reports requirement iii. Report write according to correct format iv. Report presented to superior according to procedure
		i. Determine procedure to write report ii. Determine types of report iii. Determine various type of report format iv. Write report according to report format v. Present report to superior	<u>Attitude:</u> i. Meticulous in writing report	10 hours	Demonstration, Observation & Practical	

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information 01.02 Document information, procedures or processes 01.03 Utilise basic IT application 01.04 Analyse information 02.01 Interpret and follow manuals, instructions and SOP's 02.03 Communicate clearly 02.04 Prepare brief reports and checklist using standard form 02.10 Prepare reports and instructions 03.05 Demonstrate safety skills 04.09 Prepare project/ work plans 06.02 Comply with and follow chain of command	1. Communication skills 1. Conceptual skills 2. Interpersonal skills 3. Multitasking and prioritizing 4. Self-discipline 5. Teamwork 6. Learning skills 7. Leadership skills

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Computer	1 : 1
2. Office equipment	1 : 10
3. Schedule chart	1 : 10
4. Organization chart	1 : 10
5. Manpower planning	1 : 10
6. Stationery items	1 : 1
7. Performance management system (PMS)	1 : 10
8. Standard Operating Procedure for Job record and log book/ project file	1 : 1
9. Technician personel file	1 : 1

10. Material requisition form	1 : 1
11. Quotation	1 : 1
12. Accident report form	1 : 1
13. Audio and video tapes	1 : 10
14. Operation records	1 : 1
15. Training records	1 : 1
16. Maintenance records	1 : 1
17. Procedures, rules and policies	1 : 10
18. Technical expertise	1 : 1
19. Maintenance checklist	1 : 1
20. Documentation	1 : 1

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CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector		ELECTRICAL POWER								
Job Area		THREE PHASE ELECTRICAL INSTALLATION & MAINTENANCE								
Competency Unit Title		ELECTRICAL SIGNAGE(NEON) INSTALLATION & MAINTENANCE								
Competency Unit Descriptor		Electrical signage (neon) installation & maintenance is to carry out activities for electrical signage (neon) system according to Electrical Act 1990, Electrical Regulation 1994 and other related rules and regulations body and statutory requirements. The personnel who are competent in the electrical signage (neon) installation & maintenance must be able to identify electrical signage (neon) installation requirements and procedures, carry out electrical signage (neon) installation & maintenance, carry out electrical testing including resistance testing, polarity testing, continuity testing, earthing testing and to prepare installation & maintenance report on electrical signage (neon) installation & maintenance								
Competency Unit Code			Competency Type	Elective	Level	3	Training Duration	72	Credit Hours	
Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental		Training Hours	Delivery Mode	Assessment Criteria			
1. Identify electrical signage (neon) installation requirement	i. Site survey for location ii. Approval letter from BOMBA and regulatory body iii. Signage size as per-required by client (height , length & width) iv. Installation fire man switch as per requirement by BOMBA and Energy Commission (ST)				4 hours	Lecture	i. Electrical signage (neon) site survey for location determined ii. Letter approval from BOMBA checked iii. Fire man switch as per requirement determined			
		i. Identify site survey for location ii. Check letter for approval from BOMBA iii. Identify fire man switch as per requirement			8 hours	Demonstration, Observation & Practical				

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			<u>Attitude:</u> i. Barricade for high voltage transformer ii. Safety and danger signage surrounding installation iii. Fire man switch install according authority specification <u>Safety:</u> i. Use appropriate PPE Use PPE (Glove, Goggle, Safety boot)			
2. Plan Electrical signage (neon) installation & maintenance activities	i. Type of drawing <ul style="list-style-type: none"> • Survey drawing • Layout drawing • Single line drawing • Key plan • Location plan • Site plan • As built drawing ii. Determination protection devices			4 hours		i. Type of drawing for electrical signage (neon) installation determined ii. Platform structure & concrete base determined iii. Layout schematic diagrams format checked according to

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	iii. Platform structure & concrete base iv. Setting for pylon to construct billboard v. Main frame earthing vi. Schematic diagrams					standard format
		i. Identify type of drawing ii. Determine protection devices iii. Determine platform structure & concrete base iv. Identify setting for pylon to construct billboard v. Determine main frame earthing vi. Interpret schematic diagrams	<u>Attitude:</u> i. Barricade for high voltage transformer ii. Safety and danger signage surrounding installation iii. Fire man switch install according authority specification	10 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			<u>Safety:</u> i. Use appropriate PPE Use PPE (Glove, Goggle, Safety boot)			
3. Carry out electrical signage (neon) installation	i. Marking & measurement between neon tube to fulfill billboard requirement ii. Electrical signage (neon) holder according to tube design installation iii. Installation of neon tube on holder iv. Connection and termination neon tube in proper order v. Testing of circuit and equipment for electrical signage (neon) <ul style="list-style-type: none"> • Insulation resistance test • Earth resistance test • Polarity test • Ratio test on transformer • Residual Current Devices (RCD) tester 			8 hours	Lecture	i. Marking & measurement between neon tube determined to fulfill billboard requirement ii. Electrical signage (neon) holder determined according to tube design installation
		i. Identify marking & measurement between neon tube to fulfill billboard requirement		12 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		<ul style="list-style-type: none"> ii. Install holder according to tube design iii. Install neon tube on holder iv. Connect and terminate neon tube in proper order v. Test circuit and equipment for electrical signage (neon) 	<p><u>Attitude:</u></p> <ul style="list-style-type: none"> i. Barricade for high voltage transformer ii. Safety and danger signage surrounding installation iii. Fire man switch install according authority specification <p><u>Safety:</u></p> <ul style="list-style-type: none"> i. Use appropriate PPE Use PPE (Glove, Goggle, Safety boot) 			
4. Carry out electrical signage (neon) maintenance	<ul style="list-style-type: none"> i. Installation of neon tube on holder ii. Connection & termination neon tube in proper order iii. Visual checking tubing of neon : 			4 hours	Lecture	<ul style="list-style-type: none"> i. Neon tube on holder installed correctly ii. Connection & termination neon tube determined iii. Visual tubing of elec-

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Air cracks • Leaking • Termination oxide (corrosive) iv. Testing of circuit and equipment for electrical signage (neon) <ul style="list-style-type: none"> • Insulation resistance test • Earth resistance test • Polarity test • Radio Test On Transformer • Residual Current Devices (RCD) tester • Fireman switch functional test v. Procedure of electrical signage (neon) inspection					trical signage (neon) checked iv. Testing of circuit and equipment for electrical signage (neon) checked v. Procedure of electrical signage (neon) inspected
		i. Install neon tube on holder ii. Connect and terminate neon tube in proper order iii. Check visual tubing of neon iv. Test circuit and equipment for electrical signage (neon) v. Adhere of procedure of electrical signage (neon) inspection	<u>Attitude:</u>	10 hours	Demonstration, Observation & Practical	

Work Activities	Related Knowledge	Applied Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			i. Housekeeping <u>Safety:</u> i. Use appropriate PPE Use PPE (Glove, Goggle, Safety boot)			
5. Prepare electrical signage (neon) installation & maintenance report	i. Procedure to produce electrical signage (neon) ii. Procedure to submit electrical signage (neon) for approval iii. 'As built' electrical signage (neon) preparation iv. Report writing skills			4 hours	Lecture	i. Procedure to produce electrical signage (neon) submitted ii. Procedure of electrical signage (neon) reported iii. Report skill wrote
		i. Determine procedure to produce electrical signage (neon) ii. Determine procedure to submit electrical signage (neon) for approval to superior iii. Prepare 'as built' electrical signage (neon) iv. Write electrical signage (neon) installation activities	<u>Attitude :</u> i. Neat and tidy ii. Alertness	8 hours	Demonstration, Observation & Practical	

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information 01.02 Document information, procedures or processes 02.01 Interpret and follow manuals, instructions and SOP's 02.04 Prepare brief reports and checklist using standard form 03.03 Accept responsibility for own work and work area 03.05 Demonstrate safety skills 04.01 Organize own work activities 04.06 Allocate work 04.09 Prepare project/ work plans 06.02 Comply with and follow chain of command 06.01 Understand system 06.03 Identify and highlight problems	1. Communication skills 1. Conceptual skills 2. Interpersonal skills 3. Multitasking and prioritizing 4. Self-discipline 5. Teamwork 6. Learning skills 7. Leadership skills

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Schematic diagram	1 : 1
2. Block Diagram	1 : 1
3. Measuring and Test Instruments	1 : 1
4. Components/Parts Specification	1 : 1
5. Distribution Boards	1 : 2
6. Trunking Tools	1 : 1
7. Equipment Data Book	1 : 1
8. IEE Regulation book	1 : 1
9. Electrical Equipment	1 : 1

10. Electrical hand tools	1 : 1
11. Electrical power tools	1 : 1
12. Electrical Accessories	1 : 1
13. Electrical Fittings	1 : 1
14. Electrical Testing Instrument	1 : 1
15. Double Insulated cable	1 : 1
16. Wiring lead	1 : 1
17. Wiring neil	1 : 1
18. Cables	1 : 1
19. PVC Tape	1 : 1
20. Standard Operating Procedure	1 : 1

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