

CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	INFRASTRUCTURE SUPPORT								
Job Area	COMPUTER SYSTEM ADMINISTRATION								
Competency Unit Title	COMPUTER NETWORK MAINTENANCE MANAGEMENT								
Learning Outcome	<p>The person who is competent in this CU shall be able to manage network that involves corrective and preventive measures to ensure excellent condition of computer network in term of functionality and reliability in accordance with computer network system technical support requirements. Upon completion of this competency unit, trainees will be able to: -</p> <ul style="list-style-type: none"> • Analyse network maintenance requirement • Develop computer network maintenance management plan • Manage computer network maintenance • Produce computer network maintenance report. 								
Competency Unit ID	1	Competency Type	Core	Level	5	Training Duration	200 Hours	Credit Hours	20
Work Activities	Related Knowledge	Related Skills		Attitude / Safety / Environmental		Training Hour	Delivery Mode	Assessment Criteria	
1. Analyse network maintenance requirement	i. ISO/IEC: 8648:1988 (Interconnection- internal organisation of the network layer) ii. Computer network maintenance documents: <ul style="list-style-type: none"> • Previous maintenance report • Vendor service manual • SLA (Service Level Agreement) 					15hours	Lecture, Case study/ problem based learning	i. Network diagram interpreted ii. Previous maintenance report analysed iii. Computer network threat and business impact assessed iv. Users' feedback related on network perform-	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hour	Delivery Mode	Assessment Criteria
	<p>iii. Computer network layout/diagram contents</p> <ul style="list-style-type: none"> • Main distribution frame <ul style="list-style-type: none"> - Switch - Router - Server - Wireless devices - Computer and peripherals • ISP • Types of cable (by colour code) • Types of network (LAN, WAN, MAN, CAN) <p>iv. User's feedback on network performance</p> <p>v. Computer network threat and business impact analysis</p> <ul style="list-style-type: none"> • Hardware failure • Software failure • Security threat and risk • Business continuity impact • Technical staff capability 					<p>ance analysed</p>

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hour	Delivery Mode	Assessment Criteria
		i. Interpret network diagram ii. Analyse previous maintenance report iii. Assess computer network threat and business impact iv. Analyse users' feedback on network performance	<u>Attitude:</u> i. Analytical mind in analysing previous maintenance report ii. Detail in interpreting network diagram <u>Safety/Environment:</u> i. Adhere to company network security policy	15 hours	Demonstration, observation and scenario based training	
2. Develop computer network maintenance management plan	i. Types of computer network maintenance <ul style="list-style-type: none"> • Preventive • Corrective • Predictive ii. Company resources related to computer network maintenance: <ul style="list-style-type: none"> • budget • skilled staff 			20 hours	Lecture & case study / problem based learning	i. Types of computer network maintenance determined ii. company resources requirement related to computer network maintenance

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hour	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • tools iii. Bandwidth management software iv. Computer network maintenance time <ul style="list-style-type: none"> • Destructive • Non destructive v. Computer network maintenance announcement and trouble ticket vi. Computer network maintenance management plan preparation: <ul style="list-style-type: none"> • Work breakdown structure • Timeline • Maintenance schedule • Job checklist • Manpower • Gantt chart • Maintenance cost vii. Computer network maintenance job order content <ul style="list-style-type: none"> • Job specification • Job checklist • Timeline/ schedule 					<p>estimated</p> <ul style="list-style-type: none"> iii. Bandwidth management software selected iv. Computer system threat (hardware failure, software failure, technical staff capability) assessed v. Maintenance tasks / work breakdown structure determined vi. Computer network maintenance management plan prepared vii. Computer network maintenance checklist and job order prepared

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hour	Delivery Mode	Assessment Criteria
	viii. Technical writing skills					
		<ul style="list-style-type: none"> i. Determine types of computer network maintenance ii. Determine and estimate company resources requirement related to computer network maintenance iii. Determine bandwidth management software iv. Assess computer system threat (hardware failure, software failure, technical staff capability) v. Determine maintenance tasks / work breakdown structure vi. Prepare computer network maintenance management plan and present to superior vii. Prepare computer network maintenance announcement and submit to superior for approval viii. Prepare computer network maintenance checklist and job order 		20 hours	Observation, & Project	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hour	Delivery Mode	Assessment Criteria
			<p><u>Attitude:</u></p> <ul style="list-style-type: none"> i. Precise in evaluating computer network maintenance needs and requirement ii. Meticulous in analysing users' feedback related to network maintenance <p><u>Safety/Environment:</u></p> <ul style="list-style-type: none"> i. Adhere to company network security policy 			
<p>3. Manage computer network maintenance</p>	<p>i. Network maintenance tasks</p> <ul style="list-style-type: none"> • Network configuration • Main distribution frame cleaning task <ul style="list-style-type: none"> - Switch - Router - Server - Computer and peripherals - Mobile devices • Server health check • Server housekeeping • Network 			55 hours	Lecture, group discussion, case study / problem based learning	<ul style="list-style-type: none"> i. Skills and competency level in network maintenance identified and listed out ii. Server maintenance task listed out and interpreted iii. Computer network maintenance report analysed

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hour	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> configuration and interconnectivity tests • PENTEST (Penetration test) ii. Computer network maintenance and management: <ul style="list-style-type: none"> • Fault tolerance management software <ul style="list-style-type: none"> - Hardware errors - Software errors - Data transmission errors • Configuration management <ul style="list-style-type: none"> - Develop and update configuration - User and access configuration • Performance management <ul style="list-style-type: none"> - Network performance criteria setting - Measure network performance • Security management 					<ul style="list-style-type: none"> iv. network maintenance job order variance reviewed and rectified v. computer network configuration executed vi. Hardware, software and data transmission error rectified vii. PENTEST carried out viii. Computer network maintenance expenses monitored ix. Network support service quality and user's feedbacks evaluated x. Network threat and risks managed

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hour	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> - Access right - Data sensitivity (CIA: Confidentiality, Integrity, Availability) <p>iii. Computer network maintenance procedure</p> <ul style="list-style-type: none"> • Failure identification • Acquire permission to perform unscheduled maintenance management <p>iv. Network support service</p> <ul style="list-style-type: none"> • Level of support service <ul style="list-style-type: none"> - 3rd Level - 2nd Level - 1st Level • User's feedbacks and complaints handling <p>v. Maintenance costing</p> <ul style="list-style-type: none"> • Firewall licensing <ul style="list-style-type: none"> - Anti virus - IPS (Intrusion Protect Service) - IDS (Intrusion Detected Service) • Hardware 					<p>xi. Computer network maintenance service quality checklist prepared</p>

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hour	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> - Switch - Router - Cable - NIC vi. Service quality improvement analysis <ul style="list-style-type: none"> • Root cause analysis • Cost and effect analysis vii. Managerial skill: <ul style="list-style-type: none"> • Delegation • Monitoring • Supervision • Coordinating • Coaching 					
		i. Identify subordinate skills and competency level in network maintenance ii. Delegate and supervise subordinate for network maintenance task and monitor work progress <ul style="list-style-type: none"> • Main distribution frame cleaning • Server housekeeping • Server health check iii. Analyse network maintenance report iv. Review and rectify net-		55 hours	Observation Project, simulation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hour	Delivery Mode	Assessment Criteria
		<p>work maintenance job order variance</p> <ul style="list-style-type: none"> v. Execute network configuration vi. Rectify hardware, software and data transmission error vii. Carry out PENTEST viii. Control computer network maintenance expenses ix. Evaluate network support service quality and user's feedback x. Manage network threat and risks xi. Assess computer network maintenance service quality 	<p><u>Attitude:</u></p> <ul style="list-style-type: none"> i. Firm when delegating and monitoring computer network maintenance task to team members ii. Accountable in controlling expenses iii. Firm in monitoring network support service quality <p><u>Safety/Environment:</u></p> <ul style="list-style-type: none"> i. Adhere to company SOP and security policy 			

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hour	Delivery Mode	Assessment Criteria
4. Produce computer network maintenance management report.	i. Report writing ii. Presentation skill iii. Document management system <ul style="list-style-type: none"> • Coding: naming convention • Recording • Filing • Document safety • Confidentiality iv. Computer network maintenance report : <ul style="list-style-type: none"> • Preventive maintenance • Corrective maintenance v. Computer network support service report: <ul style="list-style-type: none"> • Issue / problem • root cause analysis • User's feedbacks summary • Action taken • Recommendation for process improvement vi. Computer network maintenance management report contents:			10 hours	Lecture & case study	i. Network maintenance analysis report prepared <ul style="list-style-type: none"> • Network performance status analysed • Executed maintenance work listed out • Next maintenance task /work suggested • Improvement proposed ii. Computer network support service report produced <ul style="list-style-type: none"> • Issue/problem identified and listed out • Root cause identified • User's feedback analysed • Action to be taken proposed and listed out

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hour	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Work breakdown structure • Schedule and Timeline • Job specification • Job checklist • Network maintenance team members • Job execution details: <ul style="list-style-type: none"> - Date & time - Team member involved - Job variance - Rectification • Maintenance expenses • Other matters / issues related to network maintenance <p>vii. Compilation of network maintenance management related documents</p>					<ul style="list-style-type: none"> • Process improvement recommended <p>iii. Produce network maintenance management report produced and executed tasks highlighted</p> <ul style="list-style-type: none"> • Work breakdown structure • Schedule and timeline • Job checklist • Network maintenance team members • Job execution details: <ul style="list-style-type: none"> - Date & time - Team members involved - Job variance - Rectification • Maintenance expenses • Other matters / issues related to network
		<p>i. Prepare network maintenance analysis report</p> <ul style="list-style-type: none"> • Network performance status • Maintenance work • Suggestion for next maintenance • Suggestion for improvement 		10 hours	Coaching & Project	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hour	Delivery Mode	Assessment Criteria
		<ul style="list-style-type: none"> ii. Prepare computer network support service report <ul style="list-style-type: none"> • Issue/problem • root cause • User's feedback • Action taken • Recommendation for process improvement iii. Produce network maintenance management report and highlight executed tasks <ul style="list-style-type: none"> • Work breakdown structure • Schedule and timeline • Job checklist • network maintenance team members • Job execution details: <ul style="list-style-type: none"> - Date & time - Team members involved - Job variance - Rectification • Maintenance expenses • Other matters / issues related to network maintenance 				<p style="text-align: center;">maintenance</p> <ul style="list-style-type: none"> iv. Network maintenance management related documents compiled and filed in accordance with document management system

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hour	Delivery Mode	Assessment Criteria
		iv. Compiled and filed network maintenance management related documents	<p><u>Attitude:</u></p> <ul style="list-style-type: none"> i. Detail and transparent in analysing root cause of network problem ii. Detail in preparing network maintenance report <p><u>Safety/Environment:</u></p> <ul style="list-style-type: none"> i. Adhere to document confidentiality and safety policy 			

Employability Skills

Core Abilities	Social Skills
04.08 Develop and negotiate staffing plans 04.09 Prepare project/work plans	1. Teamwork 2. Learning skill

Core Abilities	Social Skills
05.03 Allocate and record usage of financial and physical resources 05.04 Delegate responsibilities and/or authority 06.08 Identify and analyze effect of technology on the environment	3. Self-discipline 4. Leadership skill 5. Conceptual skills 6. Interpersonal skills 7. Communication skills 8. Multitasking and prioritizing

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1) Server 2) LCD Projector 3) Sample of SLA 4) Computer / laptop 5) Computer network 6) Sample of vendor service manual 7) Tolerance management software 8) Sample of computer network layout / diagram 9) Sample of computer network maintenance checklist	1:25 1:25 1:1 1:5 1:25 1:5 1:1 1:1

REFERENCES

1. [Neal Allen, Fluke Networks Staff](#) (2009). [*Network Maintenance and Troubleshooting Guide: Field Tested Solutions for Everyday Problems \(2nd Edition\)*](#) (2nd Edition) Addison-Wesley Professional. ISBN-13: 978-0-321-64741-2
2. [TAFESA](#) (2006). [*Network Maintenance*](#). ISBN-13: 978-0-7339-7767-1
3. [Adolfo Crespo Márquez, Juan F. Gómez Fernández](#) (2011). [*Maintenance Management in Network Utilities : Framework and Practical Implementation*](#).
4. [James Edwards, Edwards, Richard Bramante](#) (2009). [*Networking : OSI, TCP/IP, LANs, MANs, WANs, Implementation, Management, and Maintenance*](#) . John Wiley & Sons. ISBN-13: 978-0-470-40238-2,

CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	INFRASTRUCTURE SUPPORT								
Job Area	COMPUTER SYSTEM MANAGEMENT								
Competency Unit Title	COMPUTER SYSTEM ASSET MANAGEMENT								
Learning Outcome	<p>The person who is competent in this CU shall be able manage company's computer systems asset more effectively to saves time and money by eliminating unnecessary purchases and wasted resources. Upon completion of this competency unit, trainees will be able to:</p> <ul style="list-style-type: none"> • Analyse computer asset management requirement • Develop computer system asset management plan • Manage computer system asset • Prepare computer system asset management report 								
Competency Unit ID	2	Competency Type	Core	Level	5	Training Duration	350 Hours	Credit Hours	35
Work Activities	Related Knowledge	Related Skills		Attitude / Safety / Environmental		Training Hours	Delivery Mode	Assessment Criteria	
1. Analyse asset management requirements	i. Standard <ul style="list-style-type: none"> • ISO/IEC 27002: Computer system asset management standard • ISO/IEC 19770: Software Asset Management Computer system asset disposal management Standard ii. Legislative and authority <ul style="list-style-type: none"> • Copyright Act 1987 					40 hours	Lecture, Case study/ problem based learning	i. Computer system asset management standard reviewed and checklist produced ii. Company procedure and policies related to IT and computer system asset interpreted iii. Types of com-	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Malaysia Business Software Alliance (BSA) <p>iii. Company procedures and policies related to computer system & IT asset:</p> <ul style="list-style-type: none"> • Procurement procedure • Purchasing procedure • Maintenance procedure • IT security • Asset inventory • IT asset disposal <p>iv. Types of computer system asset</p> <ul style="list-style-type: none"> • Consumable (toner, cartridge, ribbon) • Rental / leasing (LCD projector, PC , laptop, printer, multifunction, etc) • Fixed asset / infrastructure (Server rack, CCTV, Door access system, pc, printer, etc) <p>v. IT & computer system asset life-cycle manage-</p>					<p>puter system asset listed out and its requirements checklist produced</p> <p>iv. IT and computer system asset life-cycle management and its requirements interpreted</p> <p>v. Computer system asset management practice and its requirements assessed</p> <p>vi. Computer system inventory status assessed</p>

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<p>ment</p> <ul style="list-style-type: none"> • Procurement Management <ul style="list-style-type: none"> - Request - Received and validated - Lease vs. purchase • Financial Management on asset <ul style="list-style-type: none"> - Lease management - License management - Warranty management - Asset maintenance management • Asset Operation Management: <ul style="list-style-type: none"> - Move, add, change - SLA monitoring - Support service - Break & fix • End of life: <ul style="list-style-type: none"> - Storage - Retirement - disposal <p>vi. Computer system asset</p>					

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<p>management practice:</p> <ul style="list-style-type: none"> • Hardware asset control <ul style="list-style-type: none"> - Procurement - Operation <ul style="list-style-type: none"> o Maintain o Support o Sustain - Retire - Recycle - Disposal • Software asset control <ul style="list-style-type: none"> - Procurement - Licenses - Versions - installation • configuration and change control <ul style="list-style-type: none"> - application configuration <p>vii. Computer system asset management goals:</p> <ul style="list-style-type: none"> • process improvement • Inventory control • Accountability and compliance • Assets performance enhancement • Business availability improvement 					

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	viii. Computer system inventory information: <ul style="list-style-type: none"> • Category (hardware, software, consumable, infrastructure) • Quantity • Location • User name /detail • Operational status • Supplier / vendor detail • Warranty • Serial number/ service tag number 					
		i. Review computer system asset management standard and checklist produced ii. Analyse company procedure and policies related to IT and computer system asset iii. Asses types of computer system asset and its requirements: iv. Interpret IT & computer system asset life-cycle management		41 hours	Demonstration, observation and scenario based training	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		<ul style="list-style-type: none"> ⌚. Define computer system asset management practice and its requirements ⌚. Asses computer system inventory status 	<p><u>Attitude:</u></p> <ul style="list-style-type: none"> i. Detail in assessing types of computer system asset and its requirements: ii. Meticulous in defining computer system asset management practice and its requirements iii. Precise and accurate in analysing asset management requirement <p><u>Safety/Environment:</u></p> <ul style="list-style-type: none"> i. Adhere to company computer system asset management policy 			

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
<p>2. Develop computer system asset management plan</p>	<p>i. Scope of computer system asset management policy:</p> <ul style="list-style-type: none"> • Asset mobility • Physical security for hardware protection • Data and application security protection • Computer system performance • Computer system lifespan • Asset revision • Computer system replacement/ upgrade policy • Disposal policy <p>ii. Business impact analysis related to computer system and IT asset management.</p> <ul style="list-style-type: none"> • Business continuity • Productivity • Service quality • Management cost <ul style="list-style-type: none"> - Storage - Maintenance / repair cost <p>iii. Company resources related to computer system asset management:</p> <ul style="list-style-type: none"> • Cost estimation 			35 hours	Lecture & case study / problem based learning	<p>i. Scope of computer system asset management determined and outlined</p> <p>ii. Business impact analysis result related to computer system asset management checklist produced</p> <p>iii. Computer system asset management budget estimated</p> <p>iv. Storage space requirement determined</p> <p>v. Asset management software selected</p> <p>vi. Computer system asset management plan produced</p>

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Storage • requirement iv. Asset management software <ul style="list-style-type: none"> • Licensed • Licensed Open source • Freeware v. Contents of asset management plan: <ul style="list-style-type: none"> • Scope • Objective • Work breakdown schedule • Space • Hardware asset labelling • Software asset cataloguing vi. Technical writing skills vii. Presentation skills					
		i. Determine scope of computer system asset management ii. Interpret business impact analysis result related to computer system and IT asset management. iii. Estimate computer sys-		35 hours	Observation, & Project	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		tem asset management budget iv. Determine storage space requirement v. Establish asset management software vi. Prepare computer system asset management plan	<p><u>Attitude:</u></p> i. Rational when determine scope of computer system asset management ii. Meticulous in interpreting business impact analysis result related to computer system and IT asset management. iii. Accurate in estimating resources related to computer system asset management: <p><u>Safety/Environment:</u></p> i. Adhere to company computer system asset management			

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			policy			
3. Manage computer system asset	<p>i. Computer system & IT asset management stage:</p> <ul style="list-style-type: none"> • procurement • Inventory • Operation • Storing • disposal <p>ii. Procurement process</p> <ul style="list-style-type: none"> • Requisition: order • Communication and coordination <ul style="list-style-type: none"> - Finance - IT technician - Asset Manager - Security - Training • Allocation to user • Equipment received by user <p>iii. Asset management repository contents:</p> <ul style="list-style-type: none"> • User details • Location • Asset type • Model & serial number • Purchase and leasing cost 		87 hours	Lecture, group discussion, case study / problem based learning	<p>i. Asset procurement checklist prepared</p> <p>ii. Assets information detail for inventory update listed out</p> <p>iii. Assets tag and label prepared</p> <p>iv. Asset change of part , change of user , location list prepared</p> <p>v. Assets status tracking list prepared</p> <p>vi. Leased asset contract terms and conditions interpreted</p> <ul style="list-style-type: none"> • Warranty card endorsed • Maintenance services verified 	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Purchase and leasing information • Termination or replacement date • Maintenance, repair, change & upgrade information • History <p>iv. Asset tagging and labelling</p> <p>v. Asset change management</p> <ul style="list-style-type: none"> • Change of part due to upgrading or repair • Change user & location <p>vi. Asset tracking</p> <ul style="list-style-type: none"> • Active assets • In-active assets • Retire assets • Un-traceable assets (damage, loss, theft) • End-of-lease assets <p>vii. Contract management for leased asset</p> <ul style="list-style-type: none"> • Warranty • Maintenance services • Upgrading services 					<ul style="list-style-type: none"> • Upgrading services suggested <p>vii. Software assets managed</p> <ul style="list-style-type: none"> • Licensing • Versioning updating • Company developed software/ application <p>viii. Computer system assets management budget estimated</p> <p>ix. Computer system assets value assessed for financial report</p> <p>x. Computer system asset disposal carried out</p> <p>xi. Asset inventory audit organised and audit checklist prepared</p> <p>xii. Asset manage-</p>

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> - Hardware capacity - Software version <p>viii. Management of software asset</p> <ul style="list-style-type: none"> • Licensing • Versioning updating • Software asset (company developed software/application) <p>ix. Financial issues related to asset</p> <ul style="list-style-type: none"> • Property asset value • depreciation <p>x. Budget allocation issues related to asset</p> <ul style="list-style-type: none"> • Asset procurement • Asset maintenance cost <p>xi. Computer system asset disposal method</p> <ul style="list-style-type: none"> • Lease return • Employee sale • Donation • Cannibalism : components are extracted for the parts inventory • Scrap 					<p>ment awareness program module prepared</p> <p>xiii. Computer system asset management efficiency evaluated</p>

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<p>xii. Asset inventory audit</p> <ul style="list-style-type: none"> • Internal audit • External audit <p>xiii. Content of asset management policy and procedure awareness program to staff:</p> <ul style="list-style-type: none"> • Staff responsibility on computer system & IT assets • Company assets management policy and procedure • Replace of equipment • Return of equipment <p>xiv. Evaluation of asset management efficiency:</p> <ul style="list-style-type: none"> • Asset type • Assets location • User / owner • Asset status • Asset performance and productivity • Lease termination dates • Contract terms & conditions • Software licenses • Asset warranty details • Asset change (location, user, part or 					

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	component) xv. Management skill <ul style="list-style-type: none"> • Resource planning • Leadership • Budgeting • Business administration function 					
		i. Monitor computer system asset procurement ii. Delegate subordinate to record computer assets into Asset Management System iii. Delegate and monitor subordinate for asset tagging and labelling iv. Monitor and record asset change: <ul style="list-style-type: none"> • Change of part due to upgrading or repair • Change of user & location v. Track assets status <ul style="list-style-type: none"> • Active assets • In-active assets • Retire assets • Un-traceable assets 		88 hours	Demonstration, observation and scenario based training	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		<p>(damage, loss, theft)</p> <ul style="list-style-type: none"> • End-of-lease assets <p>vi. Interpret leased asset contract terms and conditions</p> <ul style="list-style-type: none"> • Warranty • Maintenance services • Upgrading services <p>vii. Manage software assets</p> <ul style="list-style-type: none"> • Licensing • Versioning updating • Company developed software/application <p>viii. Estimate computer system assets management budget</p> <ul style="list-style-type: none"> • Asset procurement budget • Asset maintenance cost <p>ix. Assess computer system assets value for financial report</p> <p>x. Carry out computer system asset disposal</p> <p>xi. Organise and coordinate asset inventory audit</p>				

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		xii. Conduct asset management awareness program to staff xiii. Evaluate computer system asset management efficiency	<p><i>Attitude:</i></p> <ul style="list-style-type: none"> i. Firm when delegate subordinate to perform tasks ii. Accurate in estimating computer asset management budget iii. Thorough in tracking assets status iv. Analytical mind in interpreting leased asset contract terms and conditions v. Accurate in assessing computer system assets value vi. Transparent in evaluating computer system asset management efficiency <p><i>Safety/Environment.</i></p>			

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			i. Adhere to company disposal standard and policy ii. Adhere to environmental policy			
4. Prepare asset management report	i. Compilation of assets related documents <ul style="list-style-type: none"> • Warrant card • SLA • Leasing agreement • Licensing • Company developed software / application document ii. Computer asset Inventory report iii. Disposal report iv. Financial report v. Asset management policy and procedure awareness program report			12 hours	Lecture & case study	i. Computer system & IT assets related documents compiled and filed <ul style="list-style-type: none"> • Warrant card • SLA • Leasing agreement • Licensing • Company developed software / application documents ii. Computer system assets management report produced <ul style="list-style-type: none"> • Computer asset Inventory report verified • Disposal report verified • Financial
		i. Compile and file computer system & IT assets related documents for future references <ul style="list-style-type: none"> • Warrant card 		12 hours	Coaching & Project	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		<ul style="list-style-type: none"> • SLA • Leasing agreement • Licensing • Company developed software / application document ii. Produce computer system and IT assets management report: <ul style="list-style-type: none"> • Computer asset Inventory report • Disposal report • Financial report • Asset management policy and procedure awareness program report 	<p><u>Attitude:</u></p> <ul style="list-style-type: none"> i. Details and meticulous in preparing asset management report. iii. Systematic in compiling and filing computer system & IT assets related documents for future references <p><u>Safety/Environment:</u></p> <ul style="list-style-type: none"> i. Adhere to company confidenti- 			report validated <ul style="list-style-type: none"> • Asset management policy and procedure awareness program report verified

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			ality policy			

Employability Skills

Core Abilities	Social Skills
	<ol style="list-style-type: none"> 1. Teamwork 2. Learning skill 3. Self-discipline 4. Leadership skill 5. Conceptual skills 6. Interpersonal skills 7. Communication skills 8. Multitasking and prioritizing

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)

1) LCD Projector	1:25
2) Sample of SLA	1:1
3) Computer / laptop	1:5
4) Copyright Act 1987	1:1
5) Sample of Warrant card	1:1
6) Sample of warranty card	1:1
7) Sample of software licence	1:1
8) Sample of asset Tag & Label	1:1
9) Asset management software	1:5
10) Sample asset inventory report	1:1
11) Sample of vendor service manual	1:1
12) ISO/IEC 27002: Computer system asset management standard	1:1
13) ISO/IEC 19770: Software Asset Management Computer system asset disposal management Standard	1:1

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CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	INFRASTRUCTURE SUPPORT								
Job Area	COMPUTER SYSTEM MANAGEMENT								
Competency Unit Title	COMPUTER SYSTEM SECURITY MANAGEMENT								
Learning Outcome	<p>The person who is competent in this CU shall be able to management and protect company's valuable information and services against unauthorised use, risks and threats. Upon completion of this competency unit, trainees will be able to:</p> <ul style="list-style-type: none"> • Analyse computer system security management requirement • Plan computer system security management • Manage computer system security • Produce computer system security management report 								
Competency Unit ID	3	Competency Type	Core	Level	5	Training Duration	300 Hours	Credit Hours	30
Work Activities	Related Knowledge	Related Skills		Attitude / Safety / Environmental		Training Hours	Delivery Mode	Assessment Criteria	
1. Analyze computer system security management requirements	i. Computer system security standard <ul style="list-style-type: none"> • ISO/IEC 27002 ii. Law and regulations <ul style="list-style-type: none"> • Malaysia Cyber law: Computer Crime Act 1997 • Security legislation and regulation iii. Company policy related to computer system security					35 hours	Lecture, Case study/ problem based learning	i. Computer system security policy and standard interpreted and security checklist produced ii. Computer system as-built diagram defined iii. Network security technologies evaluated iv. Security issues	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Physical security control • Procedural control • Technical control • Legal and regulatory or compliance <p>v. Security objectives:</p> <ul style="list-style-type: none"> • Resource protection • Authentication • Integrity • Availability of data and application. <p>vi. Computer system as-built diagram</p> <p>vii. Computer system architecture and system security</p> <ul style="list-style-type: none"> • security of computer system • Network security issues • Security problems and countermeasures <p>viii. Computer system security technologies</p> <ul style="list-style-type: none"> • cryptographic applications • crypto technology • encryption systems 					<p>and counter-measures identified</p> <p>v. Business need analysis result related to network security analysed</p> <p>vi. Financial requirement related to computer system security assessed</p>

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	ix. Business impact analysis related to computer system security <ul style="list-style-type: none"> • Business continuity • Productivity • Service quality • Business confidentiality x. Costing requirement <ul style="list-style-type: none"> • Upgrading cost • Maintenance cost • Licensing cost • Inventory cost • Disposal cost 					
		i. Interpret network security policy and standard ii. Assessed computer system as-built diagram iii. Evaluate network security technologies iv. Analyse security issues of computer system and network v. Identify security problems and countermeasures vi. Analyse business need analysis result related to network security vii. Asses financial requirement related to computer system security	<i>Attitude:</i>	34 hours	Demonstration, observation and scenario based training	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			i. Precise in identifying security problems and countermeasures ii. Meticulous in analysing computer system security requirements. iii. Rational in evaluating computer system security technologies <u>Safety/Environment.</u> i. Adhere to computer system security policy and standard			
2. Plan computer system security management	i. Computer system security threats and risk: <ul style="list-style-type: none"> • Exposure • Intrusion • Interception • Inference ii. Computer system security policies <ul style="list-style-type: none"> • System Access • Data Access method • User access right • Authentication • Company confidential- 			30 hours	Lecture, group discussion, case study / problem based learning	i. Computer system security threats and risks identified <ul style="list-style-type: none"> • Exposure • Intrusion • Interception • Inference ii. Business impact over computer system security identified

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<p>ity policy on data and information</p> <p>iii. Business continuity risks</p> <ul style="list-style-type: none"> • Computer system risk and threat evaluation • Strategies and solution mitigation <p>iv. Security tools:</p> <ul style="list-style-type: none"> • Antivirus • Patches • Network monitoring agent <p>v. Company resources:</p> <ul style="list-style-type: none"> • Computer system security management cost <ul style="list-style-type: none"> - Upgrading cost - Maintenance cost (Hardware, Software) - Licensing cost - Staff training • Staff <ul style="list-style-type: none"> - Knowledge and skills - Number of staff <p>vi. Content of computer system security management plan:</p>					<p>iii. Computer system security tools prepared</p> <p>iv. Resources to manage computer system security estimated</p> <p>v. Computer system security management program schedule developed</p> <p>vi. Computer system security work breakdown prepared</p> <p>vii. Computer system security management plan produced</p> <p>viii. Computer system security control job order prepared and IT Executive (L4) assigned</p>

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Summary • Scope • Objective • Risk and threat • Business impact • Cost benefit analysis • Computer system security management checklist • Schedule and Gantt chart • Work breakdown structure • Budget <p>vii. Technical writing viii. Presentation skill</p>					
		<p>i. Identify computer system security threats and risks</p> <p>ii. Identify business impact over network security</p> <p>iii. Prepare security tools</p> <p>iv. Estimate resources to manage computer system security</p> <p>v. Develop computer system security management program schedule</p> <p>vi. Prepare computer system security work breakdown</p>		30 hours	Observation, & Project	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		<p>vii. Produce computer system security management plan</p> <p>viii. Prepare computer system security checklist and job order</p>	<p><u>Attitude:</u></p> <p>i. Precise in identifying computer system security threats and risks</p> <p>ii. Accurate in estimating resources to manage network security</p> <p>iii. Thorough in developing computer system security management program schedule</p> <p>iv. Meticulous in preparing computer system security work breakdown</p> <p><u>Safety/Environment:</u></p> <p>i. Adhere to computer system security policy and standard</p>			

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
3. Manage computer system security	i. Cause of computer system data loss: <ul style="list-style-type: none"> • Viruses • Human errors • Software malfunction • Hardware malfunction • Natural disaster ii. Data protection <ul style="list-style-type: none"> • Viruses <ul style="list-style-type: none"> - Firewall installation - Antivirus installation - Data back-up - Beware of anonymous email • Human errors <ul style="list-style-type: none"> - Avoid mistake • Software malfunction <ul style="list-style-type: none"> - Avoid misusing program - Avoid using pirated software - Software back-up • Hardware malfunction <ul style="list-style-type: none"> - Use UPS - Be sure enough space when copying iii. Computer system access control management			75 hours	Observation Project, Laboratory work	i. Subordinate skills and competency level in computer physical system security deployment, computer system maintenance and security back-up identified and listed out ii. Computer system security control task checklist prepared iii. Manage computer system access control <ul style="list-style-type: none"> • User access control and network access control monitored • Password creation policy established • Unauthorised physical access controlled

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • User access control • Network access control • Password management • Unauthorised physical access control • Files and documents access control • Remote user access control <p>iv. Computer system security policies</p> <ul style="list-style-type: none"> • Password • back-up • Software update • Physical security <ul style="list-style-type: none"> -safe place -use UPS -cable management • Computer files protection <p>v. Password creation policy:</p> <ul style="list-style-type: none"> • Capture character (Captcha) • Security questions • Expiry (6 months, 12 months, 18 months) • Length of password • Alpha number and special character • Encryption scheme: 					<ul style="list-style-type: none"> • Files and documents access rights established • Remote user access rule developed <p>iv. Computer system security policies developed</p> <p>v. Digital file cabinet security setting created</p> <p>vi. Illegal operating system and software identified</p> <p>vii. Computer system security audit checklist prepared</p> <p>viii. Computer system security manual produced</p> <p>ix. Security awareness program and technical</p>

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> - Message Digest number 5 (MD5) vi. Security management for network <ul style="list-style-type: none"> • Network configuration • Remote access to the company's organisation through <ul style="list-style-type: none"> -Authentication -Encryption -Privileges • Protect network peripheral from malicious attack through: <ul style="list-style-type: none"> -Security configuration -Firewall set-up vii. Security policy for operating system <ul style="list-style-type: none"> • Housekeeping • Avoid using pirated viii. Security awareness program for staff / users ix. Computer system security audit x. Computer system security management plan effectiveness evaluation: 					<ul style="list-style-type: none"> training manual produced x. Computer system security management expenses analysed xi. Computer system security management effectiveness evaluated

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Security related incident • User's complaints • Security protection status <p>xi. Computer system security management implementation expenses</p> <p>xii. Security awareness program for staff and users</p> <ul style="list-style-type: none"> • Briefing • Technical training • Demonstration • Training manual preparation <p>xiii. Computer system security manual</p> <ul style="list-style-type: none"> • User manual • Administrator manual <p>xiv. Computer system security issues</p> <ul style="list-style-type: none"> • Security issue • Root cause • Action plan <p>xv. Managerial skill:</p> <ul style="list-style-type: none"> • Coaching • Staff training • Resource planning 					

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Budgeting 					
		<ul style="list-style-type: none"> i. Identify subordinate skills and competency level in computer physical system security deployment, computer system maintenance and security back-up ii. Delegate and supervised subordinate to execute computer system security control iii. Manage computer system access control iv. Implement computer system security policies v. Develop and enforced password creation policy vi. Create network security protection setting vii. Create digital file cabinet security setting for files protection viii. Control the usage of illegal operating system and software 		75 hours	Observation, & Project, computer lab	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		<ul style="list-style-type: none"> ix. Organise and coordinate computer system security audit x. Prepare computer system security manual xi. Conduct security awareness program for staff and users xii. Control computer system security management expenses xiii. Evaluate computer system security management effectiveness 	<p><u>Attitude:</u></p> <ul style="list-style-type: none"> i. Thorough when monitor security control job ii. Meticulous when developing security policy iii. Systematic and details in preparing computer system security manual iv. Accountable in creating digital file cabinet 			

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			v. Firm in controlling illegal software <u>Safety/Environment.</u> i. Adhere to company computer system security policy			
4. Produce computer system security management report	i. Report writing ii. Analysis of computer system security control report iii. Computer system security management report <ul style="list-style-type: none"> • Work breakdown structure • Work schedule • Computer system security checklist • Security strategies • Job execution details: <ul style="list-style-type: none"> - Physical system security deployment, - computer system maintenance - security back-up - security configuration - data protection management - illegal software man- 			10 hours	Lecture & case study	t. Prepare computer system security control analysis report tt. Prepare computer system security management report <ul style="list-style-type: none"> • Work breakdown structure • Work schedule • Computer system security checklist • Security strategies • Job execution details: <ul style="list-style-type: none"> - Physical system security deployment, - computer system main-

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<p>agement - etc.</p> <ul style="list-style-type: none"> • Security risks and threats • Expenses report • Other matters / issues related to security <p>iv. Evaluation report of computer system security management effectiveness</p> <p>v. Compilation of computer system security documents</p> <ul style="list-style-type: none"> • Computer system security configuration setting • Physical security system deployment • Computer system access control policies • Digital file cabinet security setting • Computer system security manual • Training manual 					<ul style="list-style-type: none"> - tenance - security back-up - security configuration - data protection management - illegal software management - etc. • Security risks and threats • Expenses report • Other matters / issues related to security <p>xi. Produce computer system security management effectiveness evaluation report</p> <p>xii. Computer system security management documents compiled, coded and recorded</p> <ul style="list-style-type: none"> • Physical secur-
		i.				

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		<ul style="list-style-type: none"> i. Prepare computer system security control analysis report ii. Prepare computer system security management report <ul style="list-style-type: none"> • Work breakdown structure • Work schedule • Computer system security checklist • Security strategies • Job execution details: <ul style="list-style-type: none"> - Physical system security deployment, - computer system maintenance - security back-up - security configuration - data protection management - illegal software management - etc. • Security risks and threats • Expenses report • Other matters / issues related to security iii. Produce computer system security management effectiveness eval- 		11 hours	Coaching & Project	<p>ity system deployment validated</p> <ul style="list-style-type: none"> • Computer system security configuration confirmed • Computer system access control policies authenticated • Digital file cabinet security setting verified • Computer system security manual endorsed • Training manual approved

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		uation report iv. Supervise subordinate for compilation of computer system security documents <ul style="list-style-type: none"> • Computer system security configuration setting • Physical security system deployment • Computer system access control policies • Digital file cabinet security setting • Network security setting • Computer system security manual • Training manual 	<u>Attitude:</u> i. Detail and transparent in preparing report ii. Accountable when preparing expenses report <u>Safety/Environment:</u> i. Adhere to company confidentiality policy ii. Adhere to computer system security management policy			

Employability Skills

Core Abilities	Social Skills

Core Abilities	Social Skills
	<ol style="list-style-type: none"> 1. Teamwork 2. Learning skill 3. Self-discipline 4. Leadership skill 5. Conceptual skills 6. Interpersonal skills 7. Communication skills 8. Multitasking and prioritizing

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1) LCD Projector	1:25
2) Computer / laptop	1:25
3) Sample of report	1:1
4) Security standard	1:1
5) Repair toolkit (screw drivers, pliers, test pen, etc)	1:1
6) Equipment operating manuals	1:5
7) Equipment service manuals	1:1
8) Multimeter	1:1
9) Operating system recovery disc	1:5
10) Device drivers disc	1:5
11) External USB Hard disk connector	1:5
12) Data backup software	1:5
13) Cleaning kit (brush, cleaning solution, etc)	1:5
14) Network cable tester	1:5
15) Thermal paste	1:25
16) Sample of computer system asset inventory	1:5
17) Sample of SLA	1:1
18) Sample of vendor service manual	

19) Sample of computer maintenance checklist	1:1
20) Sample of computer system maintenance plan	1:1
21) Sample of maintenance management report	1:1
22) Sample of fault analysis report	1:1
23) Security software (antivirus, encryption, firewall)	1:1
24) Security appliance (antivirus, encryption, firewall)	1:1
25) Sample of Computer System Security Management Plan	1:1

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CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	INFRASTRUCTURE SUPPORT								
Job Area	COMPUTER SYSTEM MANAGEMENT								
Competency Unit Title	DISASTER RECOVERY MANAGEMENT								
Learning Outcome	<p>The person who is competent in this CU shall be able to prepare a company for unexpected disaster, ensuring the continued operation of IT related systems and rapid recovery if such events occurred. Upon completion of this competency unit, trainees will be able to:</p> <ul style="list-style-type: none"> • Analyse disaster recovery requirements • Develop disaster recovery management plan • Implement computer network disaster recovery management plan • Produce disaster recovery management report 								
Competency Unit ID	4	Competency Type	Core	Level	5	Training Duration	350 Hours	Credit Hours	35
Work Activities	Related Knowledge	Related Skills		Attitude / Safety / Environmental		Training Hours	Delivery Mode	Assessment Criteria	
1 Analyse disaster recovery requirements	i. Computer system disaster recovery standard <ul style="list-style-type: none"> • ISO/IEC 24762:2008 – Guidelines for ICT Disaster Recovery Services ii. Business continuity requirements <ul style="list-style-type: none"> • Service level agreement (SLA) • Respond time • Action time • Solution time 					58 hours	Lecture, Case study/ problem based learning	i. Disaster recovery standard interpreted and recovery checklist prepared ii. Computer system disaster recovery requirements (physical, procedural, technical) identified iii. Computer sys-	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Service operational uptime (99.9%, 99%) <p>iii. Computer system and network point of failure</p> <ul style="list-style-type: none"> • Location • Expertise • Technologies • Infrastructure • Lifespan/ end of life cycle • Natural disaster • Environment <p>iv. Business impact analysis related to computer system and network failure</p> <ul style="list-style-type: none"> • Business continuity • Productivity • Service quality • Confidentiality - <p>v. Computer system and network disaster recovery strategies:</p> <ul style="list-style-type: none"> • Data backup plan <ul style="list-style-type: none"> - Type of data - Data classification (protection level, sensitivity level, access level, critical level) 					<p>tem and network point of failure assessed</p> <p>iv. Risk and business impact related to computer system failure listed out and defined</p> <p>v. Disaster recovery strategies evaluated and evaluation findings interpreted</p>

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Computer system maintenance plan: <ul style="list-style-type: none"> - Preventive maintenance report • Application backup plan • Business resumption plan <ul style="list-style-type: none"> - Hardware availability plan - Contact person - Recovery site - Data restore plan - Building access • Computer system contingency plan <ul style="list-style-type: none"> - Emergency procedure - Roles and responsibilities • Recovery process <ul style="list-style-type: none"> - Recovery point objective - Recovery time objective 					
		i. Interpret computer system and network disaster		58 hours	Demonstration, observation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		<p>recovery standard</p> <ul style="list-style-type: none"> ii. Identify computer system and network disaster recovery requirements (physical, procedural, technical) iii. Asses computer system and network point of failure iv. Interpret risk and business impact related to computer system and network failure v. Evaluate disaster recovery strategies 	<p><i>Attitude:</i></p> <ul style="list-style-type: none"> i. Thorough in assessing system point of failure ii. Detail in interpreting risk and business impact related to computer system and network failure <p><i>Safety/Environment:</i></p> <ul style="list-style-type: none"> i. Adhere to disaster recovery 		and scenario based training	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			standard ii. Care to environmental impact in determining disaster recovery programmes			
2 Develop disaster recovery management plan	i. DRM plan development process: <ul style="list-style-type: none"> • Information gathering • Draft • Approval • Implementation • Review for improvement ii. Information gathering technique: <ul style="list-style-type: none"> • Brain storming • Interview • Questionnaire • Workshop iii. Computer system security policies and procedure <ul style="list-style-type: none"> • System Access • Data Access method • User access right • Authentication • Company data iv. Business continuity risk			52 hours	Lecture & case study / problem based learning	i. Business continuity risk listed out and defined ii. Disaster recovery tools established iii. Cost benefit to the company estimated iv. Disaster recovery strategies and solution listed out v. Company resources estimated vi. Disaster recovery management plan produced

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Risk evaluation • Mitigate strategies and solution <p>vi. Disaster recovery tools</p> <ul style="list-style-type: none"> • Hardware <ul style="list-style-type: none"> - Data backup and recovery devices • Software <ul style="list-style-type: none"> - Disaster recovery planning software • Technology <ul style="list-style-type: none"> - Cloud computing - Virtualisation <p>v. Cost benefit analysis</p> <p>vi. Company resources:</p> <ul style="list-style-type: none"> • Budget. • Staff - Knowledge and skills • Hardware and software • Equipment and facilities <p>vii. Disaster Recovery plan format</p> <ul style="list-style-type: none"> • Metrics • Mission statement • The DR committee and auditor • Documentation <ul style="list-style-type: none"> - organization's 					

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<p>hardware and software vendors</p> <ul style="list-style-type: none"> • Strategies <ul style="list-style-type: none"> - Site designation - Data backup - Drills - Backup of key personnel • Other considerations <ul style="list-style-type: none"> - Insurance - Communication - Emergency procedures - Environmental issues <p>viii. Technical writing</p>					
		<ol style="list-style-type: none"> i. Define business continuity risk ii. Establish disaster recovery tools iii. Estimate cost benefit to the company iv. Mitigate disaster recovery strategies and propose alternative solution v. Estimate company resources 		52 hours	Observation, & Project	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		vi. Produce disaster recovery management plan	<p><u>Attitude:</u></p> <ul style="list-style-type: none"> i. Rational in defining business continuity risk ii. Detail in estimating cost benefit to the company iii. Analytical mind in mitigating strategies and solution iv. Precise in estimating company resources v. Analytical mind and precise in determining tools <p><u>Safety/Environment:</u></p> <ul style="list-style-type: none"> i. Care to environmental impact in planning disaster recovery programmes. 			
3 Manage computer system and network disaster recov-	i. Disaster recovery committee ii. Computer system			52 hours	Lecture, group discussion, case study /	i. Disaster recovery awareness programmes

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
ery	<p>disaster recovery management plan dissemination method:</p> <ul style="list-style-type: none"> • Printed document • Notice on the notice board • Website • Email <p>iii. Disaster recovery plan awareness programmes, such as:</p> <ul style="list-style-type: none"> • Staff briefing • Staff training • Demonstration <p>iv. Preventive disaster recovery tasks:</p> <ul style="list-style-type: none"> • Data back-up • Application back-up • Computer system and network maintenance <p>v. Disaster recovery simulation</p> <ul style="list-style-type: none"> • Structured walk-through • Parallel test • Full interruption test <p>vi. Issues related to disaster recovery</p> <ul style="list-style-type: none"> • Insurance policy 				problem based learning	<p>manual produced</p> <p>ii. Preventive disaster recovery schedule prepared</p> <p>iii. Disaster recovery simulation performed and test result recorded</p> <p>iv. Insurance policy for disaster recovery sourced and estimated</p> <p>v. Emergency procedures manual developed</p> <p>vi. Environmental issues related to disaster recovery programmes analysed</p>

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Communication medium and its effectiveness • Emergency procedures • Environmental related issues <p>vii. Disaster recovery management audit</p> <p>viii. Environmental issue related to disaster recovery program</p> <p>ix. Disaster recovery management effectiveness:</p> <ul style="list-style-type: none"> • Automated re-route • Disaster recovery readiness • Disaster recovery tools effectiveness • Feedbacks from users <p>x. Managerial skill:</p> <ul style="list-style-type: none"> • Coaching • Staff training • Resource planning • Time management <p>xi. Presentation skill</p>					<p>xii. Disaster recovery management audit checklist prepared</p> <p>vii. Disaster recovery management effectiveness evaluated and improvement suggested</p> <p>viii. Disaster recovery management plan reviewed and improved</p>

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		<ul style="list-style-type: none"> i. Disseminate and enforce disaster recovery management plan ii. Conduct disaster recovery awareness programmes for staff and users iii. Delegate and supervise subordinate for preventive disaster recovery tasks iv. Perform disaster recovery simulation and record test result v. Source insurance policy for disaster recovery vi. Develop emergency procedures manual vii. Evaluate environmental issues related to disaster recovery programmes xiii. Organise and coordinate disaster recovery management audit 		52 hours	Observation Project, simulation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		ix. Evaluate disaster recovery management effectiveness and present evaluation findings to disaster recovery committee viii. Review and improve disaster recovery management plan	<p><u>Attitude:</u></p> i. Firm when enforce disaster recovery management plan ii. Systematic in monitoring disaster recovery management activities iii. Accurate and firm when conducting recovery management awareness programmes iv. Analytical mind in evaluating disaster recovery plan effectiveness <p><u>Safety/Environment:</u></p> i. Adhere to company security			

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			<p>procedure when conducting disaster recovery simulation</p> <p>ii. Care to environmental impact in implementing disaster recovery programmes.</p>			
4 Produce disaster recovery management report	<p>i. Report writing</p> <p>ii. Preventive disaster recovery analysis report</p> <p>iii. Evaluation report of environmental issues related to disaster recovery programmes</p> <p>iv. Disaster recovery audit report</p> <p>v. Evaluation report of disaster recovery management effectiveness</p> <p>vi. Disaster recovery management report content:</p> <ul style="list-style-type: none"> • Disaster recovery committee minute of meeting • Disaster recovery tasks 			12 hours	Lecture & case study	<p>i. Analysis report of preventive disaster recovery prepared</p> <p>ii. Environmental issues related to disaster recovery programmes identified and listed out</p> <p>iii. Disaster recovery audit checklist produced</p> <p>iv. Evaluation report of disaster recovery management effectiveness prepared and improvement</p>

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<p>and programmes details</p> <ul style="list-style-type: none"> • Disaster recovery simulation result • Strategies taken • Disaster recovery readiness • Disaster recovery tools effectiveness • Issues / problems • Solution • Expenses • Manpower involved • Other considerations <ul style="list-style-type: none"> - Insurance - Communication - Emergency procedures - Environmental issues • Other considerations <p>vii. Compilation of disaster recovery management documents</p> <ul style="list-style-type: none"> • Emergency procedures manual • Training manual • Disaster recovery related report • Minute of meeting 					<p>suggested</p> <p>v. Disaster recovery management report prepared, and disaster recovery tasks / activities highlighted:</p> <ul style="list-style-type: none"> • Disaster recovery committee minute of meeting • Disaster recovery tasks and programmes details • Disaster recovery simulation result • Strategies taken • Disaster recovery readiness • Disaster recovery tools effectiveness • Issues / problems • Solution • Expenses • Manpower involved • Other considerations
		<p>i. Create preventive disaster recovery analysis report</p>		<p>12 hours</p>	<p>Coaching & Project</p>	<ul style="list-style-type: none"> • Other considerations

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		<ul style="list-style-type: none"> ii. Produce evaluation report of environmental issues related to disaster recovery programmes iii. Generate disaster recovery audit report iv. Prepare evaluation report of disaster recovery management effectiveness v. Produced disaster recovery management report <ul style="list-style-type: none"> • Disaster recovery committee minute of meeting • Disaster recovery tasks and programmes details • Disaster recovery simulation result • Strategies taken • Disaster recovery readiness • Disaster recovery tools effectiveness • Issues / problems • Solution • Expenses • Manpower involved • Other considerations <ul style="list-style-type: none"> - Insurance - Communication - Emergency proced- 				<ul style="list-style-type: none"> - Insurance - Communication - Emergency procedures - Environmental issues • Other considerations

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		<p>ures</p> <ul style="list-style-type: none"> - Environmental issues • Other considerations <p>vi. Compilation of disaster recovery management documents</p>	<p><u>Attitude:</u></p> <p>i. Details, systematic and transparent in preparing disaster recovery management report.</p> <p><u>Safety/Environment:</u></p> <p>i. Adhere to document confidentiality and safety policy</p>			

Employability Skills

Core Abilities	Social Skills
	<ol style="list-style-type: none">1. Teamwork2. Learning skill3. Self-discipline4. Leadership skill5. Conceptual skills6. Interpersonal skills7. Communication skills8. Multitasking and prioritizing

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1) LCD Projector	1:25
2) Computer / laptop	1:25
3) Server	1:25
4) Sample of Service Level Agreement (SLA)	1:1
5) Disaster recovery planning software	1:1
6) Sample of business impact analysis report	1:1
7) ISO/IEC 24762:2008 – Guidelines for ICT Disaster Recovery Services	1:1
8) Sample of disaster recovery management analysis report	1:1
9) Sample of disaster recovery management plan effectiveness report	1:1

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CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	INFRASTRUCTURE SUPPORT								
Job Area	COMPUTER NETWORK MANAGEMENT								
Competency Unit Title	COMPUTER SYSTEM & NETWORK PROJECT MANAGEMENT								
Learning Outcome	<p>The person who is competent in this CU shall be able to execute a computer system & network project according to project management standard. Upon completion of this competency unit, trainees will be able to:</p> <ul style="list-style-type: none"> • Analyse computer system & network project requirements • Plan computer system & network project • Manage computer system & network project • Carry out computer system & network project closure 								
Competency Unit ID	5	Competency Type	Core	Level	5	Training Duration	350 Hours	Credit Hours	35
Work Activities	Related Knowledge	Related Skills			Attitude / Safety / Environmental		Training Hours	Delivery Mode	Assessment Criteria
1. Analyse computer network project requirement	i. Project Management standard practice <ul style="list-style-type: none"> • Project Management Institute (PMI) ii. Company project management procedure and guidelines iii. Legislation & regulations governing the management of IT: <ul style="list-style-type: none"> • Software licensing • Cyber Terrorism Act 						35 hours	Demonstration, observation and scenario based training	i. Project specification identified ii. Computer system & network technology requirements assessed iii. Business requirements analysed iv. Project information source Identified

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Copyright iv. Computer network Project management process <ul style="list-style-type: none"> • Project initiation <ul style="list-style-type: none"> - Kick off - Objective and scope - Schedule and budgeting - Project organisation - Project resources • Project implementation <ul style="list-style-type: none"> - Project planning - Network design - Procurement - Installation - Testing - Training to end users - UAT - Roll-out • Project monitoring and control <ul style="list-style-type: none"> - Cost control - Change control - Resource control - Risk control - Coordination: 					<ul style="list-style-type: none"> v. Users' requirements defined

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<p>Stakeholders, funders, project owner</p> <ul style="list-style-type: none"> • Project closure <ul style="list-style-type: none"> - Project evaluation - Documentation - Knowledge Management <p>v. Project information source</p> <ul style="list-style-type: none"> • Tender and quotation source: <ul style="list-style-type: none"> - e-perolehan - News paper advertisement • Vendor contract <p>vi. User requirements:</p> <ul style="list-style-type: none"> • Network design requirements: <ul style="list-style-type: none"> - Network availability <ul style="list-style-type: none"> o Consistency delivery o Reliable performance - Network scalability <ul style="list-style-type: none"> o Number of user o Remote site - Network 					

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> manageability <ul style="list-style-type: none"> ○ Web-based management ○ Console management • Technology requirements: <ul style="list-style-type: none"> - Internet Service Provider (ISP) - Enterprise Topology - Traffic Model - Equipment Selection - Routing - Protocol Design - Addressing - Naming Conventions - Inter Operating System (IOS) Services - Domain Name Services (DNS) - Dynamic Host Control Protocol (DHCP) Services - Bandwidth - security • Business needs: <ul style="list-style-type: none"> - Business continuity - Secure 					

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	environment (Confidentiality, Integrity, Availability)					
		vi. Identify project specification vii. Assess computer system & network technology requirements viii. Analyse business requirements ix. Identify project information source x. Define users' requirements	<u>Attitude:</u> i. Meticulous in analysing project information ii. Details in defining user requirements <u>Safety/Environment:</u> i. Adhere to regulatory requirements	35 hours	Demonstration, observation and scenario based training	
2. Plan computer network project	i. Project management team <ul style="list-style-type: none"> • Project Manager • Project team members 			44 hours	Observation, & Project	i. Type of network topology determined

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Key stakeholders • Project owner • Project sponsor <p>ii. Computer system & network project phases</p> <ul style="list-style-type: none"> • Project analysis • Network design • Procurement • Installation • Testing • Roll-out • closure <p>iii. Types of network topology</p> <ul style="list-style-type: none"> • Star • Bus • Mesh • Hybrid • Ring • Tree • One-to-one • Hierarchical • Client-server • Multiple nodes <p>iv. Project infrastructure</p> <ul style="list-style-type: none"> • Hardware <ul style="list-style-type: none"> - Server - Switch - Firewall - Router 					<p>ii. Network design tools selected</p> <p>iii. Network project infrastructure (Hardware, Software, Equipment) established</p> <p>iv. Project cost estimated</p> <p>v. Project team members' skill and competency level determined and listed out</p> <p>vi. Project work breakdown structure (WBS) prepared</p> <p>vii. Project Gantt chart produced</p> <p>viii. Project planning document produced:</p>

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Software <ul style="list-style-type: none"> - Operating System - Application - Antivirus - Patches - Malware • Cables • Equipment and facilities <ul style="list-style-type: none"> - Server room - Server rack v. Network design tools: <ul style="list-style-type: none"> • Licensed software (e.g: visio) • Non-licensed vi. Resource planning <ul style="list-style-type: none"> • Cost estimation <ul style="list-style-type: none"> - Hardware - software - Licensing - ISP - Manpower - Management cost - Out-sourcing cost • Manpower planning <ul style="list-style-type: none"> - Technical staff - Non-technical staff - Management staff • Time 					<ul style="list-style-type: none"> • Project goal and objective established • Project organisation / project team formed • Project scope established • Project tasks determined • Project schedule and timeline determined • Project cost estimated • Project resources established

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Technology vii. Project work breakdown structure (WBS) <ul style="list-style-type: none"> • Schedule and cost baseline preparation <ul style="list-style-type: none"> - Task and resources - Task duration - Task dependencies - Creation of Gantt chart viii. Project planning software / tools <ul style="list-style-type: none"> • Licensed software • Non-licensed ix. Content of project planning document <ul style="list-style-type: none"> • Project goal • Project objective • Project organisation / project team • Project objective and scope • Project specification • Project tasks • Schedule and timeline • Budgeting 					

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Project resources 	<ol style="list-style-type: none"> i. Determine type of network topology ii. Select network design tools iii. Establish network project infrastructure (Hardware, Software, Equipment) iv. Estimate project cost v. Assess staff skill competency level and establish project team members vi. Prepare project work breakdown structure (WBS) vii. Produce project Gantt chart viii. Produce project planning document <ul style="list-style-type: none"> • Establish Project goal and objective • Form project organisation / project team • Establish project scope • Determine project tasks • Set project schedule and timeline • Estimate project cost • Establish project resources 		43 hours	Observation, & Project	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			<p><u>Attitude:</u></p> <ul style="list-style-type: none"> i. Thorough in determining project infrastructure. ii. Accurate in estimating project cost iii. Meticulous in preparing project work breakdown structure <p><u>Safety/Environment:</u></p> <ul style="list-style-type: none"> i. Adhere to Company SOP 			
3. Execute computer network project	<ul style="list-style-type: none"> i. Computer system & network project tasks: <ul style="list-style-type: none"> • Network design development • Project procurement handling • Network cabling installation • Hardware and software installation: • Configuration <ul style="list-style-type: none"> - IP configuration - User configuration - Firewall configuration - Network security 			70 hours	Lecture, group discussion, case study / problem based learning	<ul style="list-style-type: none"> i. Project team members lead and guided to execute project tasks: <ul style="list-style-type: none"> • Network design developed • Procurement handled • Cabling installed • Hardware and software installed • Configuration

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> configuration, authentication and encryption - Digital storage configuration • Project testing <ul style="list-style-type: none"> - Stress test <ul style="list-style-type: none"> ○ Reliability test ○ Burning test ○ Availability test ○ Usability test - PENTEST - User acceptance test (UAT) - Probation test - Final Acceptance Test • Project roll-out <ul style="list-style-type: none"> - End-user readiness - User Manual development - Awareness program for end users - Technical training - Hand-over ii. Project monitoring and control <ul style="list-style-type: none"> • Scope control • Cost control • Quality control 					<ul style="list-style-type: none"> performed <ul style="list-style-type: none"> • Testing carried out • Project roll-out executed ii. Project monitoring task listed out and monitoring checklist prepared iii. Project meeting conducted <ul style="list-style-type: none"> • Meeting agenda prepared • Meeting protocol listed out iv. Project risk mitigated and solution executed v. Project problems handled <ul style="list-style-type: none"> • Project problem listed out • Problem root cause identified • Solution proposed vi. Project imple-

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Schedule / timeline control • Resources control <p>iii. Project status update</p> <ul style="list-style-type: none"> • Project meeting <ul style="list-style-type: none"> - Meeting agenda - Meeting protocol - Minute of meeting format • Project progress report <ul style="list-style-type: none"> - Report format <p>iv. Risk Management</p> <ul style="list-style-type: none"> • Types of risk <ul style="list-style-type: none"> - Cost risk <ul style="list-style-type: none"> ○ Cost over-run ○ Scope creep ○ Poor estimation - Schedule risks <ul style="list-style-type: none"> ○ Inaccurate estimating ○ Resources shortfalls (eg.: staff, insufficient resources) - Technology risks <ul style="list-style-type: none"> ○ Problems with immature 					<p>mentation process improvement initiated and introduced</p> <p>vii. Module of awareness program for end users prepared</p> <p>viii. Module of technical training produce</p> <p>ix. User Manual developed</p> <p>x. Project hand-over document prepared</p>

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> technology <ul style="list-style-type: none"> ○ Use of the wrong tools ○ Hardware and software performance issues - External risk <ul style="list-style-type: none"> ○ Government regulatory changes ○ Legal issues ○ Change-driven factors - Operational risks <ul style="list-style-type: none"> ○ Insufficient communication ○ Inadequate resolution of conflict ○ Size of transaction volumes too big /huge • Risk management process <ul style="list-style-type: none"> - Identify risk - Assess and monitor the risk to propose solution - Risk responses to prepare action plan 					

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> - Assign resources - Action v. Managing problems <ul style="list-style-type: none"> • Types of project problems <ul style="list-style-type: none"> - Technical – hardware, software, infrastructure - Management - Resources – in getting the right staff - Cultural – working with others who are different - Quality – ensuring the project work well - Managing change – rapid pace of change - Legal – copyright, patent, law suits - Bureaucratic - Financial - Environment – making the right choice - Internet – access, bandwidth - Regulatory – regulation, procedures 					

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> - Personal problems – stress, health, family, finances • Problem solving process <ul style="list-style-type: none"> - Understand the problem - Define the root causes - Determine solution - Decide and plan - Implement and evaluate vi. Process improvement <ul style="list-style-type: none"> • Business Process Improvement • Business Process Re-engineering (BPR) • Business Process Automation (BPA) vii. Management skill: <ul style="list-style-type: none"> • Leadership • Time management • Resource planning • Negotiation skill • Problem solving skill • Presentation skill 					

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		i. Lead and guide project team members to execute project tasks <ul style="list-style-type: none"> • Network design development • Procurement handling • Cabling • Installation • Configuration • Testing • Project roll-out ii. Perform project monitoring and control iii. Conduct project meeting iv. Mitigate project risk and develop solution v. Handle project problems vi. Perform process improvement on project implementation vii. Organise awareness program for end users viii. Organise technical training for staff and users ix. Develop User Manual	<p><u>Attitude:</u></p> i. Firm and accountable in leading project team members ii. Systematic in monitoring project progress iii. Rational in handling problem and risks	70 hours	Observation, Project	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		x. Prepare for project hand-over				
4. Carry out computer system & network project closure	i. Technical writing skill ii. Project progress report iii. Training report iv. Network testing report v. Financial report vi. Minute of meeting vii. Project closure meeting viii. Knowledge Management <ul style="list-style-type: none"> • Documentation of project Best Practice • Documentation of project Lesson Learned ix. Compilation of documents <ul style="list-style-type: none"> • User manual • Licensing • Warranty card • Network diagram • Configuration document • Minute of meeting 			26 hours	Lecture & case study	i. Project progress report prepared ii. Training report verified iii. Network testing result analysis report prepared iv. Financial report validated v. Minute of meeting verified vi. Project closure meeting conducted <ul style="list-style-type: none"> • Project closure meeting agenda prepared • Project closure meeting checklist produced vii. Project Knowledge Management initiative conducted

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Progress report • Procurement document • Financial documents – invoices, receipts, • Training report 					<ul style="list-style-type: none"> • Project Best Practice documented • Project Lesson Learned documented
		<ul style="list-style-type: none"> i. Prepare project progress report ii. Verify training report iii. Prepare network testing result analysis report iv. Verify financial report v. Verify minute of meeting vi. Conduct project closure meeting vii. Conduct Knowledge Management initiative <ul style="list-style-type: none"> • Project Best Practice documented • Project Lesson Learned documented viii. Delegate and supervise subordinate for compilation of project docu- 		27 hours	Coaching & Project	<ul style="list-style-type: none"> viii. Delegate and supervise subordinate for compilation of project documents • Endorse User manual • Endorse Licensing • Endorse Warranty card • Validate network diagram • Verify configuration document • Verify minute of meeting • Verify progress report • Validated procurement documents • Acknowledged and verify financial documents – in-

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		<p>ments</p> <ul style="list-style-type: none"> • Endorse User manual • Endorse Licensing • Endorse Warranty card • Validate network diagram • Verify configuration document • Verify minute of meeting • Verify progress report • Validated procurement documents • Acknowledged and verify financial documents – invoices, receipts, • Verify training report 	<p><i>Attitude:</i></p> <ul style="list-style-type: none"> i. Details in preparing project report. ii. Systematic in compiling final project documents iii. Accountable in verifying financial report 			<p>voices, receipts,</p> <ul style="list-style-type: none"> • Verify training report

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			<u>Safety/Environment.</u> i. Adhere to company confidentiality policy ii. Adhere to meeting protocol			

Employability Skills

Core Abilities	Social Skills
	1. Teamwork 2. Learning skill 3. Self-discipline 4. Leadership skill 5. Conceptual skills 6. Interpersonal skills 7. Communication skills 8. Multitasking and prioritizing

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1) LCD Projector	1:25
2) Computer / laptop	1:25
3) Server	1:25
4) Project management software	1:1
5) Sample of project management plan	1:1
6) Sample project report	1:1
7) Sample of user manual	1:1
8) Sample of training manual	1:1
9) Sample of project progress report	1:1
10) Sample of training report	1:1
11) Sample of network testing report	1:1
12) Sample of financial report	1:1
13) Sample of minute of meeting	1:1
14) Sample of work breakdown structure	1:1
15) Sample of network design diagram	1:1

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CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector		INFRASTRUCTURE SUPPORT								
Job Area		COMPUTER NETWORK MANAGEMENT								
Competency Unit Title		COMPUTER SYSTEM & NETWORK STANDARD OPERATING PROCEDURE (SOP) DEVELOPMENT AND IMPLEMENTATION MANAGEMENT								
Learning Outcome		<p>The person who is competent in this CUThe person who is competent in this CU shall be able to provide proper procedure and guideline to perform computer network tasks in accordance with company's policy and requirement. Upon completion of this competency unit, trainees will be able to:</p> <ul style="list-style-type: none"> • Analyse computer system & network SOP development and implementation requirements • Prepare computer system & network SOP document • Manage SOP implementation • Produce SOP development and implementation report 								
Competency Unit ID		6	Competency Type	Core	Level	5	Training Duration	300 Hours	Credit Hours	30
Work Activities	Related Knowledge	Related Skills			Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria		
1. Analyse computer system & network SOP development and implementation requirements	i. Policy requirement <ul style="list-style-type: none"> • Company policy • Authority body requirement <ul style="list-style-type: none"> - MAMPU - MCMC ii. Identify types of document <ul style="list-style-type: none"> • procedure • guideline • Standard • Manual • Form 					45 hours	Lecture, Case study/ problem based learning	i. Business requirements analysed and listed out ii. Purpose of SOP development and implementation determined iii. Scope of SOP established		

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> iii. Scope of SOP <ul style="list-style-type: none"> • Internet usage • Network security • Network hardware/software • Digital storage • network maintenance • network management • Disaster Recovery iv. Purpose of SOP <ul style="list-style-type: none"> • Compliance • Quality control • Consistency • Completeness • Accountability • Elimination of duplication activities • Clear identification of owner • Knowledge retention v. Network SOP implementation requirements <ul style="list-style-type: none"> • Infrastructure requirements <ul style="list-style-type: none"> - physical media - Active Network Component - IP Protocol - Addressing of 					<ul style="list-style-type: none"> iv. Computer network related standard listed out and checklist prepared v. Computer network SOP implementation requirements determined and listed out

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> Network Interfaces <ul style="list-style-type: none"> - Monitoring - Management of the network • Network Devices requirements <ul style="list-style-type: none"> - Physical Connectivity - Configuration parameters - Transport Layer - Network Addressing - Prevention of unauthorized access - Fiscal Responsibility - Security • Operating System <ul style="list-style-type: none"> - Non Standard Operating Systems - Standard Operating Systems - Application Services - Network User Authentication • Disaster recovery requirements 					

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> - Disaster recovery plan - Business continuity plan • Network Services requirements <ul style="list-style-type: none"> - Gateway Services - Remote Access Services and Name Services (Domains Naming, WINS, DHCP/ RARP/ Bootp) 					
		<ol style="list-style-type: none"> i. Analyse business requirements ii. Determine purpose of SOP development and implementation iii. Establish Scope of SOP iv. Identify computer network related standard v. Determine computer network SOP implementation requirements 	<p><u>Attitude:</u></p> <ol style="list-style-type: none"> i. Details in inter- 	45 hours	Demonstration, observation and scenario based training	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			<p>preparing company's computer systems related policies</p> <p>ii. Thorough in assessing legislation & regulations governing the management of IT</p> <p><u>Safety/Environment:</u></p> <p>i. Adhere to company's computer systems related policies</p>			
<p>2. Prepare computer system & network SOP document</p>	<p>i. Information gathering technique:</p> <ul style="list-style-type: none"> • Brain storming • Interview • Questionnaire <p>ii. Business information</p> <ul style="list-style-type: none"> • Work process <ul style="list-style-type: none"> - Sequence - Workflow - Starting and ending point • System used • Decision points • Approval points <p>iii. SOP development process:</p>			<p>37 hours</p>	<p>Lecture & case study / problem based learning</p>	<p>i. Type of information related to SOP development listed out</p> <p>ii. Business / work process mapping</p> <ul style="list-style-type: none"> • Workflow prepared • Starting and ending point confirmed • Timeline for each process determined • Requirement for each pro-

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Information gathering • Work process confirmation <ul style="list-style-type: none"> - Starting and ending point • Review existing procedure • Activities mapping • Draft the SOP • Present SOP draft to the committee / management • Secure approval • SOP Implementation • Review for improvement <p>iv. SOP document format</p> <ul style="list-style-type: none"> • Objective • Scope • Work process <ul style="list-style-type: none"> - Flow chart • Job scope • Roles and responsibility • Approval authorities <p>v. Technical writing skill</p> <p>vi. Communication skill</p> <p>vii. Presentation skills</p>					<p>cess listed out</p> <ul style="list-style-type: none"> • Terms and condition of each process established <p>iii. Decision point and approval point requirement checklist prepared</p> <p>iv. System used determined</p> <p>v. SOP drafted</p> <p>vi. SOP presented to the committee / management for approval</p> <ul style="list-style-type: none"> • Effective and interactive presentation • Etiquette and protocol observed during presentation

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		i. Gather information related to SOP ii. Develop business / work process mapping iii. Determine the decision point requirements and approval point requirement iv. Establish the system used v. Draft the SOP vi. Present SOP draft to the committee / management for approval	<p><u>Attitude:</u></p> i. Meticulous in gathering information ii. Details in writing SOP	38 hours	Observation, & Project	
3. Manage SOP implementation	1. SOP dissemination media: <ul style="list-style-type: none"> • Printed document • Notice on the notice board • Website 			52 hours	Lecture, group discussion, case study /problem based learning	i. SOP dissemination medium listed out ii. SOP awareness program manual

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Email <p>ii. SOP awareness programmes, such as:</p> <ul style="list-style-type: none"> • Staff briefing • Staff training • Demonstration <p>iii. SOP effectiveness indicators:</p> <ul style="list-style-type: none"> • Users' feedback/complaints • Number of incidents, such as: <ul style="list-style-type: none"> - Accident - Damages / lost equipment • Productivity • Red tape <p>iv. Business process improvement strategies:</p> <ul style="list-style-type: none"> • Business Process Automation (BPA) • Business Process Improvement (BPI) • Business Process Reengineering (BPR) <p>v. SOP revision</p> <ul style="list-style-type: none"> • SOP review scheduling • Document control and versioning practice 					<p>prepared</p> <p>iii. SOP implementation checklist prepared</p> <p>iv. SOP implementation effectiveness indicators established</p> <p>v. Business process improvement strategies outlined</p>

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		<ul style="list-style-type: none"> i. Disseminate computer network Standard Operating Procedure (SOP) to staff and users ii. Conduct SOP awareness program to staff and users iii. Enforce and monitor SOP implementation iv. Evaluate SOP implementation effectiveness v. Perform business process improvement strategies for SOP improvement 	<p><i>Attitude:</i></p> <ul style="list-style-type: none"> i. Systematic and thorough in monitoring SOP implementation ii. Transparent in evaluating SOP implementation effectiveness <p><i>Safety/Environment:</i></p>	53 hours	Observation Project, simulation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			i. Adhere to company policy			
4. Produce SOP development and implementation report	i. SOP coding and documentation <ul style="list-style-type: none"> • Naming convention • SOP versioning ii. SOP awareness program report iii. SOP implementation effectiveness report			15 hours	Lecture & case study	i. SOP coded and recorder ii. SOP awareness program report produced iii. SOP implementation effectiveness report prepared
		i. Carry out SOP documentation ii. Produce SOP awareness program report iii. Prepare SOP implementation effectiveness report	<u>Attitude:</u> i. Details and systematic in producing report <u>Safety/Environment:</u> i. Adhere to company document management system	15 hours	Lecture & case study	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria

Employability Skills

Core Abilities	Social Skills
	<ol style="list-style-type: none"> 1. Teamwork 2. Learning skill 3. Self-discipline 4. Leadership skill 5. Conceptual skills 6. Interpersonal skills 7. Communication skills 8. Multitasking and prioritizing

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)

1) LCD Projector	1:25
2) Computer / laptop	1:5
3) Sample report	1:1
4) Sample business work flow	1:1
5) Sample of Standard Operating Procedure (SOP)	1:1

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CURRICULUM of COMPETENCY UNIT (CoCU)

Sub Sector	INFRASTRUCTURE SUPPORT								
Job Area	COMPUTER SYSTEM MANAGEMENT								
Competency Unit Title	SERVER SCRIPTING								
Learning Outcome	<p>The person who is competent in this CU shall be able to develop scripts that automate common server administrative tasks. Upon completion of this competency unit, trainees will be able to: -</p> <ul style="list-style-type: none"> • Assess server scripting requirement • Develop server script • Execute and deploy server script • Prepare server script documentation 								
Competency Unit ID	7	Competency Type	Elective	Level	5	Training Duration	120 Hours	Credit Hours	12
Work Activities	Related Knowledge	Related Skills		Attitude / Safety / Environmental		Training Hours	Delivery Mode	Assessment Criteria	
1. Analyze server scripting requirement	i. Company security policy ii. Server scripting purpose <ul style="list-style-type: none"> • Automation <ul style="list-style-type: none"> - Back-up, - data transfer - security update • Performance tuning <ul style="list-style-type: none"> - Clear log - Termination process iii. Server security requirements <ul style="list-style-type: none"> • Root access • Administrator privilege 					11 hours	Lecture, Case study/ problem based learning	i. Server security requirement assessed and checklist produced ii. Server scripting purpose determined and listed out iii. Scripting tools established iv. Server plat-	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> - User - Guest iv. Server OS / platform: <ul style="list-style-type: none"> • Licensed • Non-licensed v. List of service / process / daemon <ul style="list-style-type: none"> • Web • FTP • SMTP • IMAP4 • Database vi. List of network protocol <ul style="list-style-type: none"> • TCP • UDP • ICMP 					form determined
		i. Asses server security requirements ii. Determine server scripting purpose iii. Established scripting tools iv. Determine server platform	<u>Attitude:</u> i. Details in analyzing server scripting requirements <u>Safety/Environment:</u>	11 hours	Demonstration, observation and scenario based training	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			i. Adhere company security policy when assessing security requirements			
2. Develop server script	i. Scripting language with OS <ul style="list-style-type: none"> • Bash • Shell • C++ ii. Server scripting software <ul style="list-style-type: none"> • Compatibility checking • software installation - installation procedure • Syntax and semantic • Error debugging iii. Automation software iv. Scripting tasks: <ul style="list-style-type: none"> • Scripting software installation • Write server scripts • Server scripts testing • Server script rectification 			15 hours	Lecture & case study / problem based learning	i. Scripting language selected ii. Server scripting software installed iii. Server script written iv. Server script rectified v. Server script deployment plan prepared

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		i. Select scripting language ii. Install server scripting software iii. Write server script iv. Rectify server script v. Prepare server script deployment plan	<u>Attitude:</u> i. Knowledgeable in configuring server script ii. Accurate and in rectifying server script <u>Safety/Environment:</u> i. Adhere to company security policy	15 hours	Observation, & Project	
3. Execute and deploy server script	i. Server scripting test <ul style="list-style-type: none"> • Functionality test • deployment test • stability test • performance test ii. UAT			25 hours	Lecture, group discussion, case study / problem based learning	i. Server script installed, configured and deployed ii. Server scripting test carried out and test result recorded <ul style="list-style-type: none"> • Functionality test verified • deployment test confirmed • stability test verified iii. Scripting test result analysed and interpreted
		i. Install, configure and deploy server script ii. Carry out server scripting test and record test result iii. Analyse and interpret scripting test result iv. Perform UAT and record test result		25 hours	Observation Project, simulation	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			<u>Attitude:</u> i. Systematic in carrying out server script installation, configuration and deployment ii. Precise in conducting server script test and UAT <u>Safety/Environment:</u> i. Adhere to computer system security and company confidentiality			iv. UAT performed and test result recorded
4. Produce server scripting report	i. Report writing ii. Programmer's Manual <ul style="list-style-type: none"> • Scripting details • Operating procedure • Test plan • Test result interpretation iii. User Manual iv. Analysis of scripting test result v. Compilation of server script documents			9 hours	Lecture & case study	i. Programmer's manual and user manual prepared ii. Scripting test result analysis report prepared iii. Server script documents compiled, coded and recorded

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> • Programmer's manual • Operating procedure • User manual • Test result analysis report 					
		<ol style="list-style-type: none"> i. Prepare Programmer's Manual ii. Prepare user manual iii. Analysed scripting test result and produce analysis report iv. Compile, code and record server script documents 	<p><u>Attitude:</u></p> <ol style="list-style-type: none"> i. Detail and precise in preparing programmer's manual and user manual <p><u>Safety/Environment:</u></p> <ol style="list-style-type: none"> i. Adhere to company document management policy 	9 hours	Coaching & Project	

Employability Skills

Core Abilities	Social Skills
	<ol style="list-style-type: none"> 1. Teamwork 2. Learning skill 3. Self-discipline 4. Leadership skill 5. Conceptual skills 6. Interpersonal skills 7. Communication skills 8. Multitasking and prioritizing

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
<ol style="list-style-type: none"> 1) Server 2) LCD Projector 3) Computer / laptop 4) Scripting software 5) Text editor software 6) Sample of User Manual 7) Sample of Programmer Manual 	<ol style="list-style-type: none"> 1:25 1:25 1:25 1:1 1:1 1:1 1:1

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