STANDARD KEMAHIRAN PEKERJAAN KEBANGSAAN
(NATIONAL OCCUPATIONAL SKILL STANDARD)

STANDARD PRACTICE & STANDARD CONTENT
FOR

COMPUTER SYSTEMS OPERATION
LEVEL 3

JPK

Jabatan Pembangunan Kemahiran
Kementerian Sumber Manusia, Malaysia

STANDARD PRACTICE

STANDARD CONTENT

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NATIONAL OCCUPATIONAL SKILLS STANDARD (NOSS) FOR; COMPUTER SYSTEM OPERATION LEVEL 3

1. INTRODUCTION

The ever-changing world fuelled largely by the continuing advancement in computer technology requires organizations to be well-equipped to remain current and, to a certain extent, relevant. Businesses from multi-national corporations to home-based enterprises have to adopt current technologies to be competitive. Government agencies and institutions too, need to stay “at the top of the game” in order to provide fast, reliable and accurate services to the people.

This climate creates job opportunities in computer system operation to support the industry growth. The computer system operation personnel or known as computer system technician by most of the organisations is the first level of the computer technical support classification. It is distinguished from the higher level Computer Specialist class by the latter’s more advanced and specialized responsibility to provide support. As part of the computer system operation team, computer system technicians are much sought after by many organizations that depends strongly on reliable working condition of computer system.

Generally, computer system technicians perform computer and peripheral set-up, installation and tests of computer hardware and software, server installation and maintenance, network connectivity set-up, as well as maintenance and basic repair of equipment. In addition, they may also be responsible to keep records of software and equipment, take details of user problems by phone, in person or via e-mail, and identify and solve computer problems.

As the computer system technician is defined as a skilled-job area, its career advancement very much depends on individual experience and performance. This NOSS highlights the core competencies that can be acquired by a computer system technician.

Pre-requisite

The candidate must complete lower secondary school and must has correct colour vision to pursue this course.

2. OCCUPATIONAL STRUCTURE

The Existing Occupational Structure of Computer system Technician is illustrated in Figure 1. The NOSS development expert panels have proposed a new occupational structure as shown in Figure 2, while proposed Occupational Area Structure is illustrated in Figure 3. This job area is a single tier which specialises in computer system operation

The expert panels have agreed that the entry level for Computer system Operation is at Level 3 due to their nature of work where generally they work by following instructions and job assignment schedules that is prepared by a superior. The personnel perform a significant range of varied work activities in a variety of context, which most of the tasks are complex and non-routine.

There is a significant career path for this job title. An experienced Computer system Technician with advanced training may become IT Executive, the level 4 personnel.

EXISTING OCCUPATIONAL STRUCTURE

SECTOR	INFORMATION COMMUNICATION TECHNOLOGY (ICT)				
SUB-SECTOR	SERVICE MANAGEMENT AND DELIVERY				
JOB AREA	INFRASTRUCTURE SUPPORT			APPLICATION DEVELOPMENT	HELP DESK / CALL CENTRE
	DATA CENTRE	NETWORK & TELECOMMUNICATION	END-USER COMPUTING		
L5	ASSOCIATE SYSTEMS SPECIALIST – INFRASTRUCTURE			NO LEVEL	Associate Help Desk Support Specialist
L4	IT EXECUTIVE			NO LEVEL	Help Desk Executive
L3	NO LEVEL			NO LEVEL	NO LEVEL
L2	NO LEVEL			NO LEVEL	NO LEVEL
L1	NO LEVEL			NO LEVEL	NO LEVEL

Figure 1: Existing Occupational Structure (MDeC, 2012)

PROPOSED OCCUPATIONAL STRUCTURE

SECTOR	INFORMATION COMMUNICATION TECHNOLOGY (ICT)				
SUB-SECTOR	SERVICE MANAGEMENT AND DELIVERY				
JOB AREA	INFRASTRUCTURE SUPPORT			APPLICATION SYSTEMS DEVELOPMENT	HELP DESK / CALL CENTRE
	DATA CENTRE	NETWORK & TELECOMMUNICATION	END-USER COMPUTING	SYSTEMS MODULE DEVELOPMENT	
L5	Associate systems specialist – Infrastructure	Computer Network Manager	IT Manager	System Analyst	Associate Help Desk Support Specialist
L4	IT Executive	Computer Network Executive	IT Executive	Analyst Programmer	Help Desk Executive
L3	NO LEVEL	Computer Network Technician	**COMPUTER SYSTEM TECHNICIAN**	Lead Programmer	NO LEVEL
L2	NO LEVEL	NO LEVEL	NO LEVEL	NO LEVEL	NO LEVEL
L1	NO LEVEL	NO LEVEL	NO LEVEL	NO LEVEL	NO LEVEL

Figure 2: Proposed Occupational Structure, NOSS Development Expert Panels (2012)

PROPOSED OCCUPATIONAL AREA STRUCTURE

SECTOR	INFORMATION COMMUNICATION TECHNOLOGY (ICT)				
SUB-SECTOR	SERVICE MANAGEMENT AND DELIVERY				
JOB AREA	INFRASTRUCTURE SUPPORT			APPLICATION DEVELOPMENT	HELP DESK / CALL CENTRE
	DATA CENTRE	NETWORK & TELECOMMUNICATION	END-USER COMPUTING		
L5	NO LEVEL	Computer Network Management	Computer System Management	System Implementation & Administrator	Associate Help Desk Support Specialist
L4	NO LEVEL	Computer Network Administration	Computer System Administration	System Module Development	Help Desk Executive
L3	NO LEVEL	Computer Network Service	**COMPUTER SYSTEM OPERATION**	System Application Support	NO LEVEL
L2	NO LEVEL	NO LEVEL	NO LEVEL	NO LEVEL	NO LEVEL
L1	NO LEVEL	NO LEVEL	NO LEVEL	NO LEVEL	NO LEVEL

Figure 3: Proposed Occupational Area Structure, NOSS Development Expert Panels (2012)

3. DESCRIPTION OF COMPETENCY LEVEL

The NOSS is developed for various occupational areas. Candidates for certification must be assessed and trained at certain levels to substantiate competencies. Below is a guideline of each NOSS Level as defined by the Department of Skills Development, Ministry of Human Resources, Malaysia.

Malaysia Skills Certificate Level 1: (Operation and Production Level)	Competent in performing a range of varied work activities, most of which are routine and predictable
Malaysia Skills Certificate Level 2: (Operation and Production Level)	Competent in performing a significant range of varied work activities, performed in a variety of contexts. Some of the activities are non-routine and required individual responsibility and autonomy.
Malaysia Skills Certificate Level 3: (Supervisory Level)	Competent in performing a broad range of varied work activities, performed in a variety of contexts, most of which are complex and non-routine. There is considerable responsibility and autonomy, and control or guidance of others in often required.
Malaysia Skills Diploma Level 4: (Executive Level)	Competent in performing a broad range of complex technical or professional work activities, performed in a variety of contexts, and with substantial degree of personal responsibility and autonomy. Responsibility for the work of others and allocation of resources is often present.
Malaysia Skills Advanced Diploma Level 5: (Managerial Level)	Competent in applying a significant range of fundamental principles and complex techniques across a wide and often unpredictable variety of contexts. Very substantial personal autonomy and often significant responsibility for the work of others and for the allocation of substantial resources features strongly, as do personal accountabilities for analysis, diagnosis, planning, execution and evaluation.

4. MALAYSIAN SKILL CERTIFICATION

Candidates who have attended and successfully completed each competency shall be awarded Certificate of Attendance on that competency. Those who have attended and successfully completed all the core competencies and fulfilled Malaysian Skill certification requirements shall receive Sijil Kemahiran Malaysia (Malaysia Skills Certificate) in Computer System Operation at Level 3.

5. JOB COMPETENCIES

Computer system technician is competent in performing the following core competencies:

i. Computer system Set-up
ii. Computer system Maintenance
iii. Computer system Repair
iv. Server installation
v. Server Maintenance
vi. Computer Network Connectivity set-up
vii. Mobile Device Configuration

6. WORKING CONDITION

Computer system technicians generally work in offices, computer rooms and at their clients' workplaces. The job requires them to constantly move around, either within the office or to other business premises. Those who are responsible to repair computer and peripheral usually work indoors in repair shops or data processing centres. Those who travel to users must carry their tools and testing equipment with them. As some computer malfunctions can now be diagnosed by remote access, this lessens travel requirements for them.

Computer system technicians generally work 40 hours a week at normal office hours, but depending on the nature of the business, they may have to work beyond the normal hours including on weekends, or be on call to make emergency repairs or to meet project deadlines. Many computer system technicians especially in large corporations work on rotating shifts. Conditions may be stressful as they are usually asked to fix faults quickly.

Computer system technicians need to have basic knowledge of computer hardware, software and networks, up-to-date information about the latest developments in ICT, problem-solving ability and good communication skills for dealing with clients or peers. They need to be able to work both independently and as part of a team and be able to work well under pressure. In addition, they also need to have good hand-eye-coordination and must be able to lift heavy boxes and computer hardware.

On-the-job trainings may be offered from time to time, so a computer system technician must be prepared to continue learning new computer skills and are willing to attend a wide range of courses to update their knowledge and techniques.

7. EMPLOYMENT PROSPECT

Computer system technicians are employed by a range of organizations including government departments and agencies, institutions of higher learning, private corporations, banks, private companies that provide computer, database and network services to clients, telecommunication companies and many other private organizations. A growing number of computer system technicians are hired on a temporary or contract basis. Many of these individuals are self-employed, working independently as contractors or consultants.

8. TRAINING, INDUSTRIAL/PROFESSIONAL RECOGNITION, OTHER QUALIFICATIONS AND ADVANCEMENT

8.1 Industrial Recognition / professional qualification

There are a few professional certifications that recognise IT personnel such as The Computing Technology Industry Association (CompTIA), Cisco Networking Academy, Linux Professional Institute, SANS Institute and EC-Council.

8.2 Other prominent qualification recognised (in Malaysia or international)

Training is likely to be on the job, learning how systems work and how to deal with clients and gather the information required identifying the problem. By working with more experienced technical support officers, new employees can learn the most common problems and possible solutions.

Larger organisations may offer external training courses or in-house training opportunities. Technologies change rapidly and it is an essential part of the Computer system Technician to remain up to date with any development in hardware and software, as well as being aware of previous versions that may still be in operation.

The CompTIA A+ certification is a profession international certification for computer technician. Officially, CompTIA A+ certification is a vendor neutral certification that covers numerous technologies and operating systems from such vendors

8.3 Types of occupation for career advancement

Career advancement for computer operation level 3 personnel locally and internally is enormous. Among them are:

- Computer specialist
- Computer Technologies
- IT Sales Professional
- Technical Sales Engineer

8.4 Related industries

Computer system personnel are employed in every sector of the economy, private and public sector.

9. SOURCES OF ADDITIONAL INFORMATION

9.1 Local Organisation

- **The National IT Council (NITC) Secretariat**
  The Ministry of Science, Technology and Innovation (MOSTI)
  Level 1-7, Block C4 & C5, Complex C,
  Federal Government Administrative Centre,
  62662 Wilayah Persekutuan Putrajaya
  Telephone 603 - 8885 8000
  Fax 603 - 8888 9070
  Email nfo@mosti.gov.my
  Website www.mosti.gov.my

- **Malaysian Communications and Multimedia Commission (MCMC)**
  Off Persiaran Multimedia
  63000 Cyberjaya,
  Selangor Darul Ehsan
  Telephone 603 - 8688 8000
  Fax 603 - 8688 1000
  Email ccd@cmc.gov.my
  Website www.skmm.gov.my

- **The National ICT Association of Malaysia**
  1106 & 1107, Block B, Phileo Damansara II
  No. 15, Jalan 16/11
  46350 Petaling Jaya
  Selangor Darul Ehsan, MALAYSIA
  Telephone 603 - 7955 2922
  Fax 603 - 7955 2933
  Email info@pikom.org.my
  Website : www.pikom.org.my

- **Multimedia Development Corporation (MDeC)**
  MSC Malaysia Headquarters
  2360 Persiaran APEC
  63000 Cyberjaya
  Selangor Darul Ehsan
  Malaysia
  Telephone 1-800-88-8338 (within Malaysia)
  Fax +603 - 8315 3115
  Email clic@MDeC.com.my
  Website www.mdec.my

- **Malaysian Administrative Modernisation and Management Planning Unit (MAMPU)**
  Level 6, Block B2
  Prime Minister's Department,
  Federal Government Administrative Centre
  62502 PUTRAJAYA
  Telephone 603 - 8872 3000
  Fax 603 - 8888 3721
  Email webmaster@mampu.gov.my
  Website www.mampu.gov.my

- **Ministry of Multimedia, Culture & Heritage**
  Kompleks Sultan Abdul Samad,
  Jalan Raja 50610, Kuala Lumpur, Malaysia.
  Telephone 603-2612 7600
  No Fax 603-2693 5114
  Email webmaster@kpkk.gov.my
  Website www.kpkk.gov.my

9.2 International Organisation

- **American Society Of Information Science And Technology**
  1320 Fenwick Ln., Ste. 510
  Silver Spring, MD 20910
  Telephone: (301) 495-0900
  Website : http://www.asis.org

- **Association For Computing Machinery**
  1515 Broadway
  New York, NY 10036
  Telephone 212) 626-0500
  Website http://www.acm.org

- **CISCO Malaysia**
  No. 31-1-17-1, Level 17
  The C.E.O, Lebuh Nipah
  1119950 Bayan Lepas, Malaysia
  Telephone: 604-631-5100
  Website http://www.cisco.com

- **EC-Council Asia Pacific**
  606, Block G, Phileo Damansara 1
  Jalan 16/11, Off Jalan Damansara
  46350 Petaling Jaya, Selangor, Malaysia.
  Telephone +60.3.7954.6896 / +60.3.7954.6873
  Fax: +60.3.7956.6585
  Website http://www.eccouncil.org

- **IEEE Computer Society**
  1730 Massachusetts Ave. NW
  Washington, DC 20036
  Telephone (202) 371-0101
  Website http://www.computer.org

- **Institute For Certification Of Computing Professionals**
  2350 Devon Ave., Ste. 115
  Des Plaines, IL 60018
  Telephone (847) 2899-4227
  Website http://www.iccp.org

- **Linux Professional Institute**
  1024 Iron Point Road
  Folsom, CA 95630, USA
  Website www.lpi.org

- **Network Professional Association**
  17 S. High St., Ste. 200
  Columbus, OH 43215
  Telephone (614) 221-1900
  Website http://www.npanet.org

- **The Computing Technology Industry Association (CompTIA)**
  3500 Lacey Road
  Suite 100
  Downers Grove, Illinois 60515
  Telephone: 630.678.8300
  Fax 630.678.8384
  Website http://www.comptia.org

10. APPROVAL DATE

The National Skills Development Board (NSDB), Ministry of Human Resources has agreed and endorsed this Standard on 24th April 2013

11. ACKNOWLEDGEMENT

The Director General of DSD would like to extend his gratitude to the organisations and individuals who have been involved in developing this standard.

12. NOSS DEVELOPMENT COMMITTEE MEMBERS

COMPUTER SYSTEM OPERATION – LEVEL 3

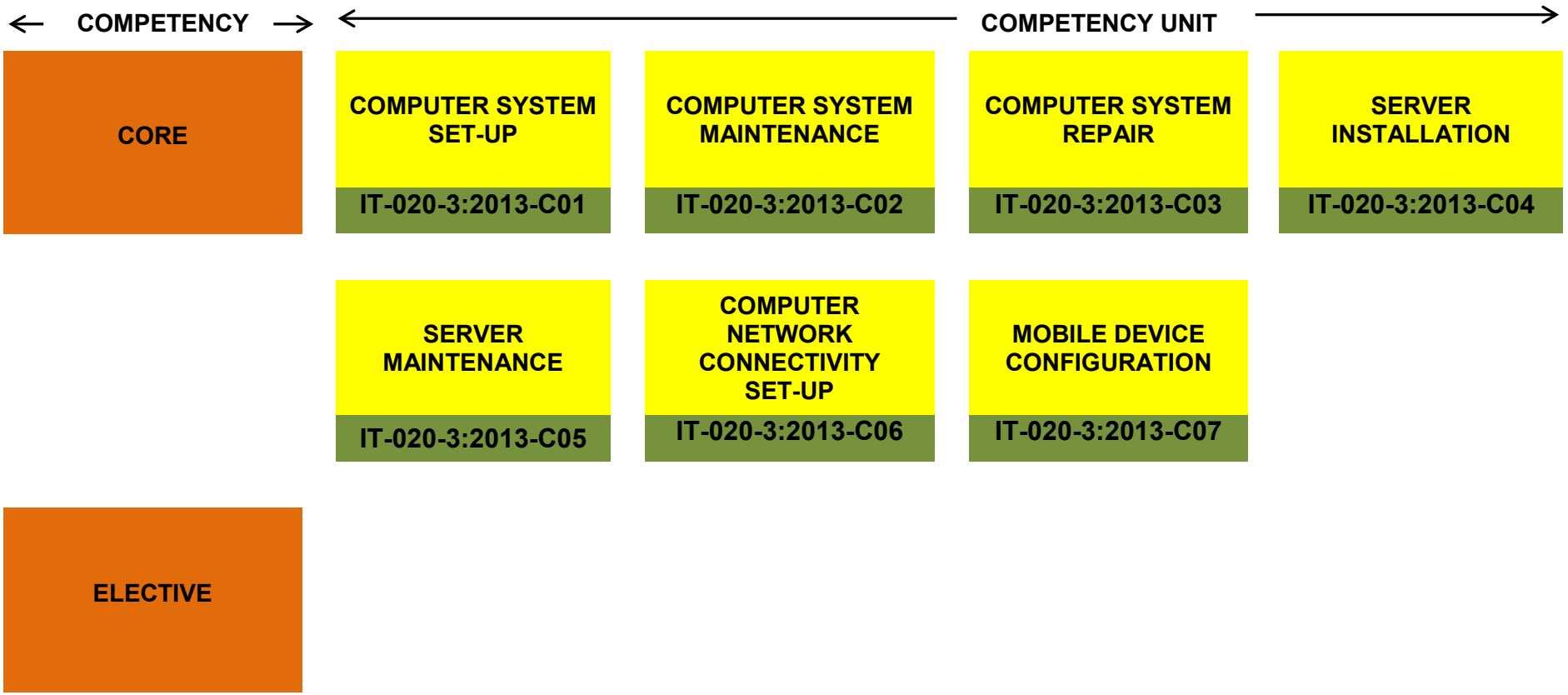
EXPERT PANELS		
1.	Ahmad Syauqi Bin Mahmud	Senior Tech Executive CMCA Sdn Bhd. (MSC-Status)
2.	Amir Bin Jamalluddin	IT Security Officer MCIS Zurish Sdn. Bhd.
3.	Fairus Zaki Bin Omar	SYSTEMS ENGINEER Premisnet System (M) Sdn. Bhd. (MSC-Status)
4.	Izzudin Bin Ismail	Business Information Strategy Manager ICT Zone Sdn. Bhd. (MSC-Status)
5.	Juraidawati Binti Arbain	Senior Lecturer Computer Sciences Universiti Industri Selangor (UNISEL)
6.	Kasful Anuar Bin Kassim	Infra Analyst ASTRO Television Network System Sdn. Bhd. (MSC-Status)
7.	Muhamad Dzukfakar Bin Zaiton	IT Executive GLOMAC
8.	Noor Azmi Bin Bahaldin	IT Support iPerintis Sdn. Bhd (MSC-status)
9.	Nur Adriany Suraya Binti Yahya	Account Manager GLOMAC Sdn. Bhd.
10.	Zawahir Bin Mohd Wazir	IT Officer Majlis Sukan Negeri Selangor
11.	Zulfadli Bin Md Zain	Wintel Engineer Kunng Tech Sdn Bhd. (MSC-Status)
FACILITATOR		
12.	Jaiyah Binti Shahbudin	Worldbay Solution Sdn. Bhd.
CO-FACILITATOR		
13.	Isvaran A/L P.Ramasamy	Worldbay Solution Sdn. Bhd.

13. GLOSSARY

1)	ADGP	Advanced Graphics Port
2)	AES	Advance Encryption Standard
3)	Bios	Basic Input Output System
4)	CD	Compact Disc
5)	CD-ROM	Compact Disc Read Only Memory
6)	CPU	Central Processing Unit
7)	DHCP	Dynamic Host Configuration Protocol
8)	DMZ	Demilitarise Zone
9)	DNS	Domain Name Server
10)	DoS	Denial of Service
11)	DRAM	Dynamic Random Access Memory
12)	ECD	Error Correcting Code
13)	EMS	Environment Monitoring System
14)	FTP	File Transfer Protocol
15)	ICMP	Internet Control Message Protocol
16)	IP	Internet Protocol
17)	IPS	Intrusion Prevention system
18)	LAN	Local Area Network
19)	LCD	Liquid Crystal Display
20)	MAN	Metropolitan Area Network
21)	Mbps	Megabit
22)	MB	Megabyte
23)	MD5	Message Digest number 5
24)	NAC	Network Access Control
25)	NAT	Network Address Translation
26)	NDA	Non-Disclosure Agreement
27)	NIC	Network Interface Card
28)	NMS	Network Monitoring System
29)	NRPE	Nagias Remote Plug-in Executor
30)	OEM:	Original Equipment Manufacturer
31)	OS:	Operating System
32)	PC:	Personal Computer
33)	PCI:	Personal Computer Interconnect
34)	PENTEST:	Penetration Test
35)	RAID:	Redundant Array of Inexpensive Disks
36)	RAM:	Random Access Memory
37)	RADIUS:	Remote Authentications Dial In User Service
38)	ROM:	Read Only Memory
39)	SAT:	Secure Ada Target
40)	SCSI:	Small Computer system Interface
41)	SDRAM:	Synchronous Dynamic Random Access Memory
42)	SOP	Standard Operating Procedure
43)	SRAM:	Static Random Access Memory
44)	TCP:	Transmission Control Protocol
45)	TKIP:	Temporary Key Integrity Protocol
46)	UAT:	User Acceptance Test
47)	USB:	Universal Serial Bus
48)	VPN:	Virtual Private Network
49)	WAN:	Wide Area Network
50)	WEP:	Wired Equivalent Privacy
51)	WPA:	Work Progress Administration

COMPETENCY PROFILE CHART (CPC)

SECTOR	INFORMATION COMMUNICATION TECHNOLOGY		
SUB SECTOR	INFRASTRUCTURE SUPPORT		
JOB AREA	END-USER COMPUTING		
JOB LEVEL	THREE (3)	NOSS CODE	IT-020-3:2013



COMPETENCY PROFILE (CP)

SECTOR	**INFORMATION COMMUNICATION TECHNOLOGY**		
SUB SECTOR	**INFRASTRUCTURE SUPPORT**		
JOB AREA	**END-USER COMPUTING**		
NOSS TITLE	**COMPUTER SYSTEM OPERATION**		
LEVEL	**THREE (3)**	**NOSS CODE**	**IT-020-3:2013**

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
1. Computer system Set-up	IT-020-3:2013-C01	Computer system set-up which is also known as computer installation, involves the installation of hardware, software and peripherals. As the process varies for each computer and software, programs (including operating systems) often come with an installer, a specialised program responsible for doing whatever is needed for their installation. Computer system set-up aims of making the hardware, software and peripheral ready for execution. The person who is competent in this competency unit shall be able to assemble computer parts and peripherals, install operating system, configure computer system components making the system connect and communicate each other and perform product	1. Analyse job order /change request 2. Prepare computer set-up tools, computer hardware parts and computer software	1.1 Job order /job request defined and interpreted and checklist produced in accordance with company procedure 1.2 User's needs and requirements obtained and confirmed 1.3 Types of computer to be set-up (e.g: PC, laptop) identified 1.4 Computer system software and peripheral identified 1.5 Work schedule determined 2.1 Condition, quantity and compatibility of computer hardware are checked and confirmed 2.2 Computer hardware components are unpacked and arranged according to company work practice

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		activation according to manufacturer instruction manual. To ensure the performance status of the computer system, functionality test and User Acceptance Test (UAT) are carried out in accordance with manufacturer instruction manual. The computer system set-up task is ended with documentation of the Operating Systems, software, drivers, backup file and warranty cards related to the computer system in accordance with company policy The outcome of this competency is to prepare computer and peripherals ready to execute tasks to fulfil user's requirement.	3. Set-up computer hardware	2.3 Computer Operating systems and software is checked and prepared according to user's requirement 2.4 Workplace cleanliness and personal hygiene maintained in accordance with company guideline 3.1 Computer hardware components are installed in accordance with manufacturer instruction manual 3.2 Computer casing/cover is installed in accordance with manufacturer instruction manual 3.3 Computer cables are checked and connected in accordance with manufacturer instruction manual. 3.4 Computer power is turned on and the computer boot up process status is analysed in accordance with manufacturer instruction manual

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
			4. Carry out computer software installation	4.1 Computer Operating systems installed in accordance with manufacturer instruction and guidelines 4.2 Computer devices driver installed in accordance with computer manufacturer instruction and guidelines 4.3 Software Application installed and tested in accordance with manufacturer instruction and guidelines 4.4 Software patches installed and tested in accordance with installation procedure 4.5 Computer security is configured in accordance with manufacturer security setting instruction/recommendation 4.6 Software back-up carried out
			5. Set-up computer peripherals	5.1 Computer peripherals connection requirement identified and connected to the correct ports in accordance with manufacturer instruction and guidelines

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				5.2 Peripherals power source turned on and the unit operation status is checked and confirmed the functionality in accordance with manufacturer instruction and guidelines 5.3 Computer peripherals driver and software are installed and tested in accordance with manufacturer instruction and guidelines
			6. Carry out unit functionality test	6.1 Computer unit test is conducted in accordance with manufacturer instruction and guidelines 6.2 Computer performance test is conducted in accordance with manufacturer instruction and guidelines 6.3 Computer load test conducted in accordance with manufacturer instruction and guidelines 6.4 Computer peripherals functional test conducted in accordance with manufacturer instruction and guidelines

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				6.5 User acceptance test (UAT) performed
			7. Prepare computer system set-up report	7.1 CD resources (Operating systems, software, drivers and backup) are recorded and stored in accordance with company policy 7.2 Warranty cards recorded in accordance with company policy 7.3 Computer set-up checklist recorded in accordance with company guideline 7.4 User Acceptance Test report prepared and submitted to superior 7.5 Computer inventory records updated in accordance with company inventory procedure 7.6 Computer set-up job order / change request report produced and closed

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
2. Computer system maintenance	IT-020-3:2013-C02	The computer system maintenance is the practice of keeping computers in a good state of performance. Two types of maintenance that the organisation normally practice which are preventive maintenance and corrective maintenance. Preventive maintenance refers to carrying out measures to prevent problems from occurring, while corrective maintenance, seeks to solve an existing problem. The objective of computer maintenance is to keep computer hardware and software in good working order, specifically its internal, protect computer system from malfunction and data loss, improve computer performance, and prolongs computer life. The person who is competent in this CU shall be able to carry out computer physical check up, software update, disk clean up, defragmentation, scan threats and performance optimization according to manufacturer instruction manual and computer system maintenance checklist.	1. Identify computer maintenance requirements 2. Carry out computer scheduled preventive maintenance	1.1 Maintenance schedule reviewed and interpreted 1.2 Previous maintenance report assessed and type of maintenance to be performed identified 1.3 Maintenance activity checklist obtained and interpreted 1.4 Maintenance tools and equipment prepared 2.1 Computer physical check-up (workplace area, cable management, cleanliness) conducted 2.2 Computer firmware and hardware checked 2.3 Software patches are installed and updated in accordance with manufacturer security/update recommendation 2.4 Computer storage device maintenance activities conducted in accordance to maintenance procedure 2.5 Computer security maintenance activities conducted in accordance to manufacturer security/update recommendation

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		The outcome of this competency is ensure excellent condition of computer in term of functionality and reliability in accordance with computer system technical support requirements to meet users' requirement The personnel who are to be trained for this competency must in prior have the following competencies: i. Competence in CU 1: Computer set-up.	3. Carry out computer corrective maintenance	2.6 Disk is cleaned-up and unusable software removed in accordance with company SOP 2.7 Computer system data backup carried out 2.8 Computer performance optimisation performed and evaluated 3.1 Previous preventive report assessed and interpreted 3.2 Computer system status assessed, diagnosed and analyzed 3.3 Faulty components identified and confirmed in accordance with company SOP 3.4 Corrective action requirement reported to supervisor and user is advised 3.5 Corrective action is carried out in accordance company SOP 3.6 Software, application, data and configuration restored and tested in accordance with user requirement and company SOP 3.7 Computer system functionality test carried out in accordance company SOP

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
			4. Prepare computer maintenance report	4.1 Maintenance activity report documented 4.2 Maintenance schedule updated 4.3 Computer maintenance job order recorded and submitted to the client for acknowledgement 4.4 Computer maintenance report produced in accordance with company SOP
3. Computer system repair	IT-020-3:2013-C03	Computer system repair refers to troubleshooting, servicing and repairing a wide variety of hardware, software and peripheral problems. Problems that typically require repair include malfunction or failed hardware components, software bugs, driver incompatibilities, spyware and malware problems, network connectivity problems, operating system upgrades, and complete computer overhauls. Computer system troubleshooting can be carried out through phone call to determine and remedy to the causes of symptoms.	1. Assess computer repair job order/ change request	1.1 Computer repair job order analysed and interpreted 1.2 Previous computer maintenance report analysed and interpreted 1.3 Computer problem symptom diagnosed and problem identified 1.4 Corrective action identified 1.5 Computer system repair checklist prepared

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		The person who is competent in this competency unit shall be able to diagnose computer system, conduct remote assistance, carry out troubleshooting, repair computer part or components, and restore software, applications, data and configurations in accordance with company procedure and manufacturer instruction manual The outcome of this competency is to produce good condition of computer system to meet user's requirement. The personnel who are to be trained for this competency must in prior have the following competencies: i. Competence in CU 1: Computer set-up.	2. Carry out online computer trouble shooting 3. Perform on-site computer repair	2.1 Computer problem/ issues from user recorded and analysed 2.2 User details, computer information, software and peripherals information recorded/retrieved and verified 2.3 Troubleshooting procedure advised to users according to troubleshooting manual 2.4 Remote assistance attempted in accordance with troubleshooting manual 2.5 Computer repair requirement suggested and advised to user 3.1 Manufacturer Instruction Manual referred and interpreted 3.2 Faulty part identified 3.3 Cost for repair estimated 3.4 Computer part purchasing requisition submitted to superior in accordance with company purchasing procedure 3.5 Computer data retrieval and back-up conducted in accordance with company SOP 3.6 Computer repair carried out in accordance with job order

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				3.7 Operating systems, software, applications, drivers, data and configurations restored in accordance with company SOP 3.8 Computer unit test, operational test and functionality test carried out 3.9 Computer operational status after repair is checked and verified 3.10 Computer repair status reported
			4. Prepare computer status report	4.1 Computer repair details recorded and status is updated for future reference 4.2 Computer repair checklist recorded and submitted to superior 4.3 Computer maintenance job order recorded and submitted to user for acknowledgement

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
4. Server Installation	IT-020-3:2013-C04	Server installation refers to the installation of server hardware, software and other components into a parent directory on the host machine. The objective of server installation is to prepare server for network setting configuration that allow hardware within the system network communicate each other as well as to connect with external network through the Internet The person who is competent in this competency unit shall be able to set-up server hardware, carry out software installation, execute server configuration and prepare for server commissioning in accordance with manufacturer instruction manual and company SOP. The outcome of this competency is to prepare server for network set-up according to clients' requirement. The personnel who are to be trained for this competency must in prior have the following competencies: i. Competence in CU 1: Computer set-up.	1. Analyse job order / change request 2. Execute hardware installation	1.1 Job order /change request defined and interpreted and checklist produced in accordance with company procedure 1.2 Types of server to be set-up (database server, file server, mail server, print server, web server) identified 1.3 Server software and peripheral identified and confirmed 1.4 Server configuration details obtained & confirmed with superior and user 2.1 Server is unpacked, arranged and checked in accordance with server handling and safety procedure 2.2 Server hardware components compatibility is checked and confirmed in accordance to manufacture's specification 2.3 Server hardware components are installed in accordance with user manual and manufacturer instruction manual

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
			3. Carry out software installation	3.1 Operating systems is installed in accordance with installation manual 3.2 Device drivers are installed, configured and tested in accordance with installation manual 3.3 Operating systems patches installed and tested in accordance with company SOP 3.4 Server parameter configuration setting executed in accordance with user's requirement 3.5 Server security configuration setting carried out in accordance with company security policy 3.6 Server is initialised and operation status is inspected and verified to ensure server is running according to job specification and Service Legal Agreement (SLA)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
			4. Perform server functionality test	4.1 Server unit testing conducted in accordance with manufacturer instruction manual 4.2 Server performance testing carried out in accordance with manufacturer instruction manual 4.3 Server load testing performed in accordance with manufacturer instruction manual 4.4 Server connectivity testing conducted in accordance with manufacturer instruction manual
			5. Prepare server installation set-up report	5.1 Server configuration information is documented for future reference in accordance with company SOP 5.2 CD resources (Operating systems, software, drivers and backup) are recorded and stored in accordance with company policy 5.3 Server warranty cards recorded in accordance with company policy 5.4 Server installation checklist recorded in accordance with company guideline

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				5.5 User Acceptance Test report prepared and submitted to superior 5.6 Inventory records updated in accordance with company inventory procedure 5.7 Server installation job order / change request report produced and closed
5. Server maintenance	IT-020-3:2013-C05	Server maintenance is the practice of keeping server in a good state of performance. It refers to the prevention or correction of faults in hardware and software by a programme of inspection and the replacement of parts The person who is competent in this competency unit shall be able to inspect server operation environment that include temperature, humidity, safety and security, interpret LED indicator, inspect server utilisation status, conduct server data back-up, asses server systems logs, and inspect server antivirus software logs in accordance with manufacturer instruction manual	1. Analyse server maintenance job order 2. Carry out hardware maintenance	1.1 Server maintenance job order interpreted 1.2 Server maintenance schedule obtained and interpreted 1.3 Type of maintenance is determined and listed out 1.4 Server maintenance requirement (tools, document, manual) identified 2.1 Server operation environment (such as workplace temperature and humidity physical safety and security) inspected 2.2 Server cables connection inspected and organised

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		and company SOP The outcome of this competency is to produce excellent condition of server in term of performance and functionality to meet user's requirement. The personnel who are to be trained for this competency must in prior have the following competencies: i. Competence in CU 1: Computer set-up ii. Competence in CU 4: Server installation		2.3 Server external surface is inspected and cleaned from dust 2.4 Server Light Emitting Diode (LED) status indicator inspected and interpreted 2.5 Server peripheral (such as Uninterrupted Power Supply-UPS, Storage Area Network - SAN, Backup Device) LED status indicator inspected 3.1 Server hardware error/faulty identified and reported to superior
			3. Perform server Operating Systems maintenance	3.2 Server utilisation status (such as disk space, memory usage, Central Processing Unit - CPU usage, network usage) inspected and recorded 3.3 Server data back-up conducted 3.4 Server backup status inspected and verified 3.5 Server systems logs assessed 3.6 Server systems status indicator (LEDs) interpreted 3.7 Critical Operating Systems patches availability recorded 3.8 Server Antivirus software logs (update log, scan log, error log) inspected and recorded.

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
			4. Prepare server maintenance report	4.1 Server maintenance checklist recorded 4.2 Server maintenance job order recorded and submitted to the client for acknowledgement 4.3 Computer maintenance report is produced
6. Computer network connectivity set-up	IT-020-3:2013-C06	Computer network connectivity set-up refers an activity which links the computer and other hardware or devices within the system such as scanner, printer, multifunction machine and fax to communicate each other to execute tasks. The person who is competent in this competency unit shall be able to carry out configuration setting to link the computer and other hardware and peripherals, maintain and troubleshoot the connectivity to ensure computers and peripherals within the system are connected each other in accordance with user's requirement and company SOP The outcome of this competency is to prepare a link among computers	1. Analyse computer network configuration specification 2. Carry out computer network connectivity configuration	1.1 Type of computer network configuration determined 1.2 Types of network connectivity (LAN, WAN, MAN, Bluetooth) identified 1.3 Computer network configuration details obtained from superior 2.1 Network adapter (wired or wireless) initialised and connected 2.2 Network configuration parameters configured, checked and verified 2.3 Network security setting configured in accordance with security requirement

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		system devices in order them to communicate each other to execute tasks according to user's requirement. The personnel who are to be trained for this competency must in prior have the following competencies: i. Competence in CU 1: Computer set-up	3. Perform computer network connectivity test	3.1 Physical connectivity inspected and confirmed 3.2 Network connection test conducted and verified in accordance to network connectivity test procedure 3.3 Connectivity test result analyzed and confirmed 3.4 Corrective action determined and executed 3.5 Computer network connectivity verified and confirmed
			4. Carry out computer network troubleshoot	4.1 Computer network test result obtained and interpreted 4.2 Computer network problem identified 4.3 Corrective action recommended to user 4.4 Troubleshoot action performed 4.5 Network connection tested and confirmed 4.6 Computer network troubleshoot status updated and reported to user and superior

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
			5. Prepare computer network connectivity report	5.1 Computer network configuration documented 5.2 Job order recorded and submitted to the user for acknowledgement 5.3 Computer network report produced
7. Mobile Device Configuration	IT-020-3:2013-C07	Mobile device refers to a variety of devices that allow people to access data and information from where ever they are. This includes smart phones, PDA and tablet. Mobile device configuration is an activity in setting up parameters value on the mobile device. The objective of mobile device configuration is to program the device and making it ready for execution as well as to provide link between the mobile device and the computer system for data sharing, printing and other purposes. The person who is competent in this competency unit shall be able to install and configure mobile application, configure security setting, carry out configuration testing and execute mobile device	1. Analyse job order/ change request	1.1 Job order /change request defined and interpreted and checklist produced in accordance with company procedure 1.2 User's needs and requirements obtained and confirmed 1.3 Types of mobile device and device operating systems identified 1.4 Mobile application requirement identified and prepared in accordance with client requirement 1.5 Mobile application compatibility identified and confirmed

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		troubleshooting in accordance with manufacturer instruction manual and company SOP. The outcome of this competency is to prepare mobile device ready for execution and connect it with computer system connectivity according to user's requirement.	2. Carry out mobile device configuration	2.1 Mobile application installed and configured in accordance with user requirement and company policy 2.2 Mobile device setting configured 2.3 Mobile device configuration tested and verified 2.4 Security configuration setting carried out in accordance with user's security requirement
			3. Perform mobile device troubleshoot	3.1 Mobile device problem diagnosed 3.2 Troubleshoot checklist prepared 3.3 User's data retrieval and back-up performed 3.4 Mobile device troubleshoot action performed in accordance to device troubleshooting guide 3.5 User's software restored in accordance with company SOP

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
			4. Carry out mobile device commissioning	4.1 Mobile device and gadget handed over to user 4.2 User Acceptance test performed in accordance with company SOP 4.3 Mobile computer set-up details recorded and filed for future reference. 4.4 Mobile computer set-up checklist recorded and registered in accordance with company guideline 4.5 Job order / change request report produced

CURRICULUM of COMPETENCY UNIT (CoCU)

SECTOR	**INFORMATION COMMUNICATION TECHNOLOGY**
SUB SECTOR	**INFRASTRUCTURE SUPPORT**
JOB AREA	**END-USER COMPUTING**
NOSS TITLE	**COMPUTER SYSTEM OPERATION**
COMPETENCY UNIT TITLE	**COMPUTER SYSTEM SET-UP**
LEARNING OUTCOME	The person who is competent in this CU shall be able to assemble computer hardware, computer peripheral and installs the software and make the computer ready to be used. Upon completion of this competency unit, trainees will be able to: - • Analyse job request/change order • Prepare computer set-up tools, computer hardware parts and computer software • Set-up computer hardware • Carry out computer software installation • Set-up computer peripherals • Carry out unit functionality test • Prepare computer system set-up report

COMPETENCY UNIT ID	**IT-020-3:2013-C01**	**LEVEL**	3	**TRAINING DURATION**	300 Hours	**CREDIT HOURS**	30

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Analyse job order / change request	i. Types of computer, such as: • Desktop • Laptop - ultra book - net book			9 hours	Lecture	i. Types of computer, peripheral and its software identified

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Thin client ii. Computer system software • Computer software - Operating system ○ Licensed ○ Open source - Productivity suite: ○ Licensed ○ Open source - Application: ○ Licensed ○ Open source iii. Computer peripherals, such as: • Input: Keyboard, mouse, Scanner • Output: Monitor, Printer, speaker iv. Computer system work function • administrative works, • multimedia, • engineering works, • sales, v. Mobility requirement: • mobile					ii. Computer system work function defined

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• in-house vi. user's venue • internal • external					
		i. Identify types of computer, peripheral and software ii. Define computer system work function	<u>*Attitude:*</u> i. Detail and precise in interpreting computer system software and peripheral ii. Analytical mind in identifying user's needs and requirements	21 hours	Demonstration, and practical	
2. Prepare computer set-up tools, computer hardware parts and computer	i. Computer hardware compatibility check-up, such as: • Computer components specification:			13 hours	Lecture	i. Computer hardware compatibility determined

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
software	- Processor - RAM - Motherboard - Hard disk • Power supply specification: - 110V - 240V ii. Computer Operating system and software information, such as: • Software Version • Chips Architecture - 32 bit - 64 bit iii. Types of computer cable connector, such as: • Network connector RJ45 • Phone connector RJ11 iv. Connector orientation, such as: • Power cable • USB (1.1, 2.0, 3.0) • Monitor cable • Network cable (RJ45) v. Types of computer					ii. Computer Operating System and software information defined iii. Computer cable connector prepared iv. Connector orientation, computer monitor connector and plug layout determined v. Computer system set-up tool prepared. vi. Electrical safety requirements adhered vii. Work area cleanliness and hygiene up-kept

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	monitor connector, such as • VGA, • DVI, • HDMI vi. Plug layout • Three pins • Two pins • International adaptor vii. Electrical safety requirements • electrostatic precaution viii. Computer system set-up tools: • screw driver, • multi meter • anti-electrostatic wristband • Vacuum cleaner ix. Computer hardware components arrangement concept: • Last In First Out (LIFO). • First In First Out (FIFO) • Last In Last Out x. Work area cleanliness					

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	and hygiene					
		i. Determine computer hardware compatibility: • Computer components specification • Power supply specification ii. Define computer operating system and software information iii. Prepare computer cable connector iv. Determine connector orientation, computer monitor connector type and plug layout type v. Prepare computer system set-up tools. vi. Adhere electrical safety requirements vii. Upkeep work area cleanliness and hygiene	*Attitude:* i. Thorough in determining computer hardware compatibility ii. Cautious in preparing hardware,	32 hours	Demonstration and practical	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			software and set-up tools <u>*Safety/Environment*</u>: i. Adhere to work area safety requirement			
3. Set-up computer hardware	i. Computer hardware components installation • Processor • Mother board • Network card • Memory module • Graphic card • Sound card • Power supply • Cooling Fan • Hard disk • Storage media • Optical drive • Casing • Heat sink • Thermal paste ii. Types of Computer casing, such as: • Mini tower • Medium tower • Desktop casing • Full tower			27 hours	Lecture	i. Computer hardware components installed ii. Computer casing installed iii. Computer warning alarm interpreted iv. Power On Self Test (POST) messages defined

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	iii. Types of computer casing/cover installation • Plug and play casing • Customised casing, such as: - Cooling system: ○ System Fan: 2 fans, 6 fans ○ Air-condition - Hard disk bays: ○ 2 bays, ○ 6 bays, ○ 8 bays iv. Types of computer warning alarm, such as: • Long beep • Short beep v. Types of power on self test (POST) messages, such as • Keyboard not connected • BIOS date • Processor bus speed error • Memory module incorrect configuration vi. Manufacturer instruction manual					

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		i. Install computer hardware components • Processor • Mother board • Network card • Memory module • Graphic card • Sound card • Power supply • Cooling Fan • Hard disk • Storage media • Optical drive • Casing • Heat sink • Thermal paste ii. Install computer casing/cover iii. Interpret computer warning alarm iv. Define power on self test (POST) messages	<u>*Attitude:*</u> i. Detail and systematic in installing computer hardware components and computer casing ii. Thorough and	63 hours	Demonstration and practical	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			details in defining computer warning alarm and Power On Self tTst (POST) messages <u>*Safety/Environment*</u>: i. Adhere to work area safety requirements ii. Adhere to manufacturer instruction manual			
4. Carry out computer software installation	i. Computer Operating system installation • Types of Operating system and its version - Licensed - Open source • Operating System Licensing - Open source - Licensed products ii. Types of computer devices driver, such as: • Graphic driver • Sound card driver			18 hours	Lecture	i. Computer Operating system installed ii. Computer devices driver installation carried out iii. Software application installation executed iv. Computer system software update

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Chipset driver • Network driver • Monitor driver iii. Software application installation: • Minimum installation requirement - Hard disk space - Memory - Processor - Optical drive • Installation license key iv. Software update v. Computer security verification,: • Anti-virus • Firewall policy • Internet browser security setting • User Credential - User account information - Network configuration - Email account vi. Software back-up • Types of software back-up - System setting					performed v. Computer security verified vi. Software back-up performed

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	back-up - OS restore back-up					
		i. Install computer operating system ii. Execute computer devices driver installation iii. Perform software application installation iv. Carry out computer system software update v. Verify computer security verification, vi. Perform software back-up	*Attitude:* i. Accurate and systematic in installing computer operating system and devices driver ii. Cautious in carrying computer software installation and software back-up *Safety/Environment*: i. Adhere to work area safety requirement ii. Adhere to	42 hours	Demonstration and practical	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			manufacturer instruction manual			
5. Set-up computer peripherals	i. Types of peripherals, such as: • Printer • Scanner • Multi function • Uninterrupted Power Supply (UPS) ii. Types of computer peripheral cables, such as: • USB cable: 1.1, 2.0, 3.0 • Parallel cable • Serial cable • Scsi cable • Firewire (IEEE 1394) • Thunder bolt iii. Peripheral driver compatibility • OS version			9 hours	Lecture	i. Types of computer peripheral and cables determined ii. Peripheral driver compatibility checked iii. Computer peripherals connection carried out
		i. Determine types of computer peripheral cables ii. Check peripheral driver compatibility iii. Carry out computer		21 hours	Demonstration and practical	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		peripherals connection • Printer • Scanner • Multi function • Uninterrupted Power Supply (UPS)	*Attitude:* i. Accurate and cautious in carrying out computer peripheral connection ii. Detail in checking peripheral driver compatibility *Safety/Environment*: i. Adhere to work area safety requirement ii. Adhere to manufacturer instruction manual			
6. Carry out unit functionality test	i. Types of computer unit test • System process cycle • Continuity Test			9 hours	Lecture	i. Computer unit test executed ii. Computer performance test carried out

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	ii. Types of computer performance test • CPU Test • Graphic Test • Sound Test • Hard disk Test • Memory Test iii. Computer peripherals functionality test iv. Preparation of computer and peripherals handing over to the end-user • Asset tagging • Labelling • Packing list • Logistic arrangement - Packing - transportation arrangement v. User Acceptance Test (UAT) verification					iii. Computer peripherals functionality test performed iv. Handing over of computer and peripherals to the end-user prepared v. User Acceptance Test (UAT) carried out
		i. Execute computer unit test • System process cycle • Continuity Test		21 hours	Demonstration and practical	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		ii. Carry out computer performance test • CPU Test • Graphic Test • Sound Test • Hard disk Test • Memory Test iii. Perform computer peripherals functionality test iv. Prepare for the handing over of computer and peripherals to the end-user v. Perform User Acceptance Test (UAT)	*Attitude:* i. Precise, analytical mind, details and accurate in carrying out computer and peripheral testing ii. Detail and thorough in preparing the handing over of computer and peripherals to the end-user *Safety/Environment*:			

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			iii. Adhere to work area safety requirement iv. Adhere to manufacturer instruction manual			
7. Prepare computer system set-up report	i. Company asset documentation: • Types of asset: - Operating system, - software, - drivers - Data backup - Warranty cards ii. User Acceptance Test report iii. Final as-buit diagram iv. Electrical schematic diagram v. Computer set-up checklist vi. Computer set-up job order / change request report			5 hours	Lecture	i. Company asset documentation carried out ii. User Acceptance Test report prepared iii. Final as-built diagram created iv. Electrical schematic diagram produced v. Computer set-up checklist recorded vi. Computer set-up job order /

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		i. Carry out company asset documentation ii. Produce User Acceptance Test report iii. Create final as-built diagram iv. Produce electrical schematic diagram v. Record computer set-up checklist vi. Prepare computer set-up job order / change request report	*Attitude:* i. Transparent and detail in preparing computer system set-up report *Safety/Environment*: i. Adhere to company confidentiality policy	10 hours	Demonstration and case study	change request report prepared

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information. 01.02 Document information procedures or processes. 01.03 Utilize basic IT applications. 02.01 Interpret and follow manuals, instructions and SOP's. 02.03 Communicate clearly. 02.04 Prepare brief reports and checklist using standard forms. 03.01 Apply cultural requirement to the workplace. 03.02 Demonstrate integrity and apply practical practices. 03.03 Accept responsibility for own work and work area. 03.05 Demonstrate safety skills. 03.06 Respond appropriately to people and situations. 03.07 Resolve interpersonal conflicts. 06.01 Understand systems. 06.02 Comply with and follow chain of command. 06.03 Identify and highlight problems. 06.04 Adapt competencies to new situations/systems. 01.04 Analyse information. 01.05 Utilize the Internet to locate and gather information. 03.08 Develop and maintain a cooperation within work group. 04.01 Organize own work activities. 04.02 Set and revise own objectives and goals. 04.03 Organize and maintain own workplace. 04.04 Apply problem solving strategies. 04.05 Demonstrate initiative and flexibility. 06.05 Analyse technical systems. 06.06 Monitor and correct performance of systems. 01.11 Apply thinking skills and creativity. 02.10 Prepare reports and instructions. 02.11 Convey information and ideas to people. 03.13 Develop and maintain team harmony and resolve conflicts. 03.14 Facilitate and coordinate teams and ideas. 03.15 Liaise to achieve identified outcomes.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Leadership skills 5. Learning skills 6. Multitasking and prioritizing 7. Self-discipline 8. Teamwork

Core Abilities	Social Skills
03.16 Identify and assess client/customer needs. 04.07 Negotiate acceptance and support for objectives and strategies. 05.01 Implement project/work plans.	

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1) LCD Projector	1:25
2) Laptop/PC	1:25
3) Computer hardware components • Processor • Mother board • Network card • Memory module • Graphic card • Sound card • Power supply • Cooling Fan • Hard disk • Storage media • Optical drive • Casing • Heat sink • Thermal paste	1:25
4) Computer casing: • Mini tower • Medium tower • Desktop casing	1:25
5) Computer Operating system and software	1:125

6) Types of computer cable connector, such as: • Network connector RJ45 • Phone connector RJ11	1:5
7) Connector orientation: • Power cable • USB (1.1, 2.0, 3.0) • Monitor cable • Network cable (RJ45)	1:5
8) Computer monitor connector, such as • VGA, • DVI, • HDMI	1:5
9) Plug layout • Three pins • Two pins • International adaptor	1:5
10) Electrostatic precaution	1:5
11) Computer system set-up tools: • screw driver, • multi meter • anti-electrostatic wristband • Vacuum cleaner	1:5
12) Sample of User Acceptance Test report	1;1
13) Sample of as-built diagram	1;1
14) Sample of Electrical schematic diagram	1;1
15) Sample of Computer set-up checklist	1;1
16) Sample of Computer set-up job order / change request report	1;1

REFERENCES

1. Books, Hephaestus (2011) . *Computer Peripherals, Including: Computer Monitor, Fax, Hard Disk Drive, Stored Energy Printer, Peripheral, Plug and Play, Auto-Configuration, Game Port, Hot Swapping, Autodetection, Surge Protector, Remote Terminal Unit*,. Western Digital Media Center. Hephaestus Books, Lightning Source Uk Ltd. ISBN-13: 978-1-242-97956-9

2. Jyoti Snehi. (2006). *Computer Peripherals and Interfacing. Firewall Media.* ISBN-13: 978-81-7008-929-2

3. R.A. Penfold. (2005). *How to Set Up Your New Computer.* Bernard Babani Publishing ISBN-13: 978-0-85934-559-0

4. Robert B J Warnar (2012). *Computer Peripheral Memory System Forecast* (Volume 500-545). General Books. ISBN-13: 978-1-235-71266-1

CURRICULUM of COMPETENCY UNIT (CoCU)

SECTOR	**INFORMATION COMMUNICATION TECHNOLOGY**						
SUB SECTOR	**INFRASTRUCTURE SUPPORT**						
JOB AREA	**END-USER COMPUTING**						
NOSS TITLE	**COMPUTER SYSTEM OPERATION**						
COMPETENCY UNIT TITLE	**COMPUTER SYSTEM MAINTENANCE**						
LEARNING OUTCOME	The person who is competent in this CU shall be able to execute preventive and corrective maintenance of the computer hardware, software and peripheral and to ensure excellent condition of computer system functionality in accordance with computer systems technical support requirements. Upon completion of this competency unit, trainees will be able to: - • Identify computer maintenance requirements • Carry out computer scheduled preventive maintenance • Carry out computer corrective maintenance • Prepare computer maintenance report						
COMPETENCY UNIT ID	**IT-020-3:2013-C02**	**LEVEL**	3	**TRAINING DURATION**	120 HOURS	**CREDIT HOURS**	12

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Identify computer maintenance requirements	i. Types of computer maintenance • Preventive • Corrective ii. Information on previous maintenance report: • Fault history • Corrective history • User history			5 hours	Lecture	i. Types of computer maintenance identified ii. Previous maintenance report assessed iii. Maintenance

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	iii. Maintenance tools • Cutter • Pliers • Crimping tools • Screw driver • Vacuum cleaner • Thermal paste					tools determined
		i. Identify types of computer maintenance ii. Assess previous maintenance report • Fault history • Corrective history • User history iii. Determine maintenance tools	*Attitude:* i. Detail and precise in assessing previous maintenance report ii. Meticulous in identifying types of maintenance to be performed	13 hours	Demonstration and case study	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
2. Carry out computer preventive maintenance	i. Task of computer preventive maintenance • workplace and workstation area check-up: - cable management - cleanliness - Temperature and humidity - Connectivity			14 hours	Lecture	i. Workstation area cleaned-up ii. Computer firmware and hardware rectified iii. Computer hardware and peripheral cable connectivity

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	contact - Power stability • Computer firmware and hardware maintenance, - BIOS - Hardware operational status o UPS o Fan o Optical drive o Input and output devices o Battery for desktop and laptop o External hard disk • Software patches installation and up-dating - Operating system patch update - Application update - Device driver update - BIOS update					diagnosed and fixed iv. Software patches are installed and updated v. Computer storage device maintenance conducted vi. Computer security maintenance performed vii. Disk defragmentation executed viii. Computer performance optimisation assessed ix. Computer data backup carried out

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Computer storage device maintenance - Disk space utilisation status - Disk check -up - Disk defragmentation - Disk clean up - Error check up • Computer security checking and updating: - Antivirus pattern up date - Threat scanning and eliminating - firewall configuration check-up - Internet configuration check-up • Computer data backup - User data backup (documents) - Email data • Computer performance					

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	optimisation evaluation - Advance system care					
		i. Clean-up workstation area ii. Rectify computer firmware and hardware iii. Diagnose and fix computer hardware and peripheral cable connectivity iv. Install and update software patches v. Conduct computer storage device maintenance vi. Perform computer security maintenance vii. Execute disk defragmentation viii. Asses computer performance optimisation ix. Carry out computer data backup	*Attitude:* i. Analytical mind and precise in rectifying	34 hours	Demonstration practical	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			computer workstation area, firmware, computer hardware and, peripherals ii. Care and cautious in installing and updating software patches and conducting security maintenance and disk defragmentation <u>*Safety/Environment*</u>: i. Adhere to work area safety requirement ii. Adhere to company confidentiality policy when conducting data back-up			
3. Carry out corrective maintenance	i. Previous maintenance report analysis • Previous			14 hours	Lecture	i. Previous maintenance report assessed

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	maintenance activities • Fault history • Corrective history • User history ii. Types of warning alarm, such as: • Long beep • Short beep iii. Types of Power On Self Test (POST) messages, such as • Keyboard not connected • BIOS date • Memory module incorrect configuration • Processor bus speed error iv. Back up data retrieval • Data retrieval procedure • Data back up v. Types of corrective action • interruptive action: • non-interruptive action					and interpreted ii. Computer system status diagnosed iii. Warning alarm interpreted iv. Power On Self Test (POST) messages defined v. Data back-up carried out vi. Types of corrective action determined vii. Faulty components determined viii. Maintenance cost estimated ix. Computer repair job performed and faulty parts

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	vi. Types of restore: • Software restore • application restoration • data restore • configuration restore vii. Computer system restoration: • Types of software • Types of data • Restoration method viii. Costing • Computer part cost • Service/ labour cost ix. Computer part disposal procedure					replaced x. Software, application, data and configuration restored xi. Computer system functionality test carried out xii. Faulty part in disposed in accordance with disposal procedure
		i. Assess and interpret previous preventive maintenance report ii. Diagnose and analyse computer system status iii. Interpret warning alarm iv. Define Power On Self Test (POST) messages v. Carry out data back-up vi. Determine types of corrective action vii. Identify faulty		34 hours	Demonstration practical	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		components viii. Estimate maintenance cost ix. Report corrective action requirement to supervisor and user x. Perform repair job and replace faulty parts xi. Restore software, application, data and configuration xii. Carry out computer system functionality test in accordance to manufacturer operating manuals xiii. Apply computer part disposal procedure to disposed faulty part	*Attitude:* i. Detail and systematic in diagnosing computer system status ii. Thorough and details in defining types of computer warning alarm and types of power on self test			

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			(POST) messages <u>*Safety/Environment*</u>: i. Adhere to work area safety requirement ii. Adhere to manufacturer instruction manual iii. Adhere to computer part disposal procedure			
4. Prepare computer maintenance report	i. Computer maintenance documentation • Maintenance checklist • Maintenance record • Record management procedure - Data compilation - Filing ii. Reporting procedure			2 hours	Lecture	i. Computer maintenance checklist recorded and compiled ii. Computer maintenance record updated iii. Computer maintenance job order / change request report prepared
		i. Record computer maintenance checklist ii. Update computer maintenance record iii. Prepare computer		4 hours	Demonstration and case study	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		maintenance job order / change request report	*Attitude:* i. Transparent and detail in preparing computer system maintenance report *Safety/Environment*: i. Adhere to company confidentiality policy and record management procedure			

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information. 01.02 Document information procedures or processes. 01.03 Utilize basic IT applications. 02.01 Interpret and follow manuals, instructions and SOP's. 02.03 Communicate clearly. 02.04 Prepare brief reports and checklist using standard forms. 03.01 Apply cultural requirement to the workplace. 03.02 Demonstrate integrity and apply practical practices. 03.03 Accept responsibility for own work and work area. 03.05 Demonstrate safety skills. 03.06 Respond appropriately to people and situations. 03.07 Resolve interpersonal conflicts. 06.01 Understand systems.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Leadership skills 5. Learning skills 6. Multitasking and prioritizing 7. Self-discipline 8. Teamwork

Core Abilities	Social Skills
06.02 Comply with and follow chain of command. 06.03 Identify and highlight problems. 06.04 Adapt competencies to new situations/systems. 01.04 Analyse information. 01.05 Utilize the Internet to locate and gather information. 03.08 Develop and maintain a cooperation within work group. 04.01 Organize own work activities. 04.02 Set and revise own objectives and goals. 04.03 Organize and maintain own workplace. 04.04 Apply problem solving strategies. 04.05 Demonstrate initiative and flexibility. 06.05 Analyse technical systems. 06.06 Monitor and correct performance of systems. 01.11 Apply thinking skills and creativity. 02.10 Prepare reports and instructions. 02.11 Convey information and ideas to people. 03.13 Develop and maintain team harmony and resolve conflicts. 03.14 Facilitate and coordinate teams and ideas. 03.15 Liaise to achieve identified outcomes. 03.16 Identify and assess client/customer needs. 04.07 Negotiate acceptance and support for objectives and strategies. 05.01 Implement project/work plans.	

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1) LCD Projector 2) Laptop/PC 3) Computer hardware components • Processor	1:25 1:25 1:25

• Mother board • Network card • Memory module • Graphic card • Sound card • Power supply • Cooling Fan • Hard disk • Storage media • Optical drive • Casing • Heat sink • Thermal paste	
4) Computer casing: • Mini tower • Medium tower • Desktop casing	1:25
5) Computer Operating system and software	1:25
6) Types of computer cable connector, such as: • Network connector RJ45 • Phone connector RJ11	1:25 1:25
7) Connector orientation: • Power cable • USB (1.1, 2.0, 3.0) • Monitor cable • Network cable (RJ45)	1:25
8) Computer monitor connector, such as • VGA, • DVI, • HDMI	1:5
9) Plug layout • Three pins • Two pins	1:5
• International adaptor	1:5

10) Electrostatic precaution 11) Computer system set-up tools: • screw driver, • multi meter • anti-electrostatic wristband • Vacuum cleaner 12) Sample of computer maintenance report 13) Sample of maintenance checklist 14) Sample of job order / change request 15) Sample of job order / change request report	1:5 1;1 1;1 1:1 1;1

REFERENCES

1. Books, Hephaestus (2011) . *Computer Peripherals, Including: Computer Monitor, Fax, Hard Disk Drive, Stored Energy Printer, Peripheral, Plug and Play, Auto-Configuration, Game Port, Hot Swapping, Autodetection, Surge Protector, Remote Terminal Unit*,. Western Digital Media Center. Hephaestus Books, Lightning Source Uk Ltd. ISBN-13: 978-1-242-97956-9

2. Jyoti Snehi. (2006). *Computer Peripherals and Interfacing. Firewall Media.* ISBN-13: 978-81-7008-929-2

3. R.A. Penfold. (2005). *How to Set Up Your New Computer.* Bernard Babani Publishing ISBN-13: 978-0-85934-559-0

4. Robert B J Warnar (2012). *Computer Peripheral Memory System Forecast* (Volume 500-545). General Books. ISBN-13: 978-1-235-71266-1

CURRICULUM of COMPETENCY UNIT (CoCU)

SECTOR	**INFORMATION COMMUNICATION TECHNOLOGY**						
SUB SECTOR	**INFRASTRUCTURE SUPPORT**						
JOB AREA	**END-USER COMPUTING**						
NOSS TITLE	**COMPUTER SYSTEM OPERATION**						
COMPETENCY UNIT TITLE	**COMPUTER SYSTEM REPAIR**						
LEARNING OUTCOME	The person who is competent in this CU shall be able to diagnose computer problem, conduct remote assistance, carry out troubleshooting, repair computer part and restore software, applications, data and configurations restored in accordance with company procedure and manufacturer manual. Upon completion of this competency unit, trainees will be able to: - • Assess computer repair job order/ change request • Carry out online computer trouble shooting • Perform on-site computer repair • Prepare computer status report						
COMPETENCY UNIT ID	**IT-020-3:2013-C03**	**LEVEL**	3	**TRAINING DURATION**	180 HOURS	**CREDIT HOURS**	12

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Assess computer repair job order/ change request	i. Type of equipment • PC/laptop • Printer • Scanner • peripherals ii. Previous computer maintenance report • Faulty history			5 hours	Lecture	i. Types of computer system / peripheral to be repaired identified. ii. Previous computer

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Corrective history • User history iii. Computer problem symptom • POST (power on self test) • LED status indicator • Beep sound • Blue screen iv. Computer system set-up tools: • screw driver, • multi meter • anti-electrostatic wristband • Vacuum cleaner					maintenance report analysed iii. Computer problem symptom diagnosed • POST checked • LED status indicator identified • Beep sound identified • Blue screen checked iv. Computer repair tools and material prepared
		i. Identify types of computer system /peripheral. ii. Analyse previous computer maintenance report iii. Diagnose computer problem symptom • Check POST (power on self test) • Identify LED (Light Emission Diode) status indicator		13 hours	Demonstration, practical and case study	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		• Identify beep sound • Check blue screen iv. Prepared tools and material	*Attitude:* i. Detail and precise in identifying types of computer system / peripheral. ii. Analytical mind and thorough in analysing previous maintenance report			
2. Carry out online computer trouble shooting	i. Computer problems / issues: • Hard disk crash • Memory (fatal error) • Power supply • motherboard ii. Corrective troubleshooting: - Remote troubleshoot - Phone instruction iii. Hardware replacement			16 hours	Lecture	i. Computer problem/ issues identified and analysed ii. Computer problem rectified through remote access iii. Computer problem identified through phone

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Memory • CPU • Hard disk • Optical drive					instruction
		i. Identify and analyse computer problem/ issues ii. Troubleshoot problem through remote access iii. Rectify problem through telephone instruction iv. Notify unsolved problem to supervisor for on-site repair	*Attitude:* i. Detail and precise in identifying computer system and peripheral problem / issue ii. Meticulous in rectifying computer problem through remote access and telephone instruction. *Safety/Environment*: i. Adhere to work area safety requirement	38 hours	Demonstration and practical	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
3. Perform on-site computer repair	i. Tasks of computer repair: • Data backup - operating system - software - applications - drivers - data - configurations • Computer diagnose • Problem identification • Procurement of computer part • Part fixing • Testing - computer unit test - operational test - functionality test ii. Computer repair costing iii. Computer repair safety precaution • Electrical Hazards iv. Computer part disposal procedure			27 hours	Lecture	i. Computer and peripheral diagnosed to identify problem according to manufacturer instruction manual ii. Repair cost estimated iii. Computer part procurement carried out iv. Data back-up executed v. Computer repair job carried out vi. Computer unit test, operational test and functionality test carried out

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		i. Diagnose computer and peripheral to identify problem according to manufacturer instruction manual ii. Estimate repair cost iii. Procure computer / peripheral part iv. Carry out data backup v. Fix computer / peripheral part vi. Perform computer unit test, operational test and functionality test vii. Apply computer part disposal procedure to dispose faulty part	*Attitude:* i. Meticulous in carrying out data back-up ii. Cost conscious in Carrying out procurement iii. Detail and precise in fixing computer/ peripheral part *Safety/Environment*:	63 hours	Demonstration and practical	vii. Computer part disposal procedure applied to dispose faulty part

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			i. Adhere to electrical hazards ii. Adhere to company confidentiality policy when carrying out data back-up			
4. Prepare computer status report	i. Computer status report: • Report format • Report content: - Client information - Problem/issues - Action taken: o troubleshoot o repair • Reporting procedure		viii. Computer repair status reported	6 hours	Lecture	i. Computer repair details recorded and status is updated for future reference ii. Computer repair checklist recorded iii. Computer repair job order recorded
		i. Record computer repair details and update computer status for future reference ii. Record computer repair checklist and submit to superior iii. Record computer repair job order		12 hours	Demonstration, practical and case study	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			Attitude: i. Accurate in recording checklist ii. Detail in recording repair job *Safety/Environment*: i. Adhere to company policy			

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information. 01.03 Utilize basic IT applications. 02.01 Interpret and follow manuals, instructions and SOP's. 02.03 Communicate clearly. 02.04 Prepare brief reports and checklist using standard forms. 03.01 Apply cultural requirement to the workplace. 03.02 Demonstrate integrity and apply practical practices.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Leadership skills 5. Learning skills 6. Multitasking and prioritizing

Core Abilities	**Social Skills**
03.03 Accept responsibility for own work and work area. 03.05 Demonstrate safety skills. 03.06 Respond appropriately to people and situations. 06.01 Understand systems. 06.02 Comply with and follow chain of command. 06.03 Identify and highlight problems. 06.04 Adapt competencies to new situations/systems. 01.04 Analyse information. 03.08 Develop and maintain a cooperation within work group. 04.01 Organize own work activities. 04.02 Set and revise own objectives and goals. 04.03 Organize and maintain own workplace. 04.04 Apply problem solving strategies. 04.05 Demonstrate initiative and flexibility. 06.05 Analyse technical systems. 06.06 Monitor and correct performance of systems. 01.11 Apply thinking skills and creativity. 02.10 Prepare reports and instructions. 02.11 Convey information and ideas to people. 03.14 Facilitate and coordinate teams and ideas. 03.15 Liaise to achieve identified outcomes. 03.16 Identify and assess client/customer needs. 05.01 Implement project/work plans.	7. Self-discipline 8. Teamwork

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1) LCD Projector	1:25
2) Laptop/PC	1:25
3) Computer hardware components	1:25
• Processor	
• Mother board	
• Network card	
• Memory module	
• Graphic card	
• Sound card	
• Power supply	
• Cooling Fan	
• Hard disk	
• Storage media	
• Optical drive	
• Casing	
• Heat sink	
• Thermal paste	
4) Computer casing:	1:25
• Mini tower	
• Medium tower	
• Desktop casing	
5) Computer Operating system and software	1:25
6) Types of computer cable connector, such as:	1:5
• Network connector RJ45	
• Phone connector RJ11	1:5
7) Connector orientation:	
• Power cable	
• USB (1.1, 2.0, 3.0)	
• Monitor cable	
• Network cable (RJ45)	

8) Computer monitor connector, such as • VGA, • DVI, • HDMI	1:5
9) Plug layout • Three pins • Two pins • International adaptor	1:5
10) electrostatic precaution	1:5
11) Computer system set-up tools: • screw driver, • multi meter • anti-electrostatic wristband • Vacuum cleaner	1:5
12) Sample of computer maintenance report	1;1
13) Sample of computer repair checklist	1:1
14) Sample of computer repair job order	1;1

REFERENCES

1. Books, Hephaestus (2011) . *Computer Peripherals, Including: Computer Monitor, Fax, Hard Disk Drive, Stored Energy Printer, Peripheral, Plug and Play, Auto-Configuration, Game Port, Hot Swapping, Auto detection, Surge Protector, Remote Terminal Unit*,. Western Digital Media Center. Hephaestus Books, Lightning Source Uk Ltd. ISBN-13: 978-1-242-97956-9

2. Fred Beisse. (2009). *A Guide to Computer User Support for Help Desk & Support Specialists* (4th Edition). Course Technology Ptr. ISBN-13: 978-0-495-80649-3

3. Jyoti Snehi. (2006). *Computer Peripherals and Interfacing. Firewall Media.* ISBN-13: 978-81-7008-929-2

4. Neal Allen (2009). *Network Maintenance and Troubleshooting Guide: Field Tested Solutions for Everyday Problems (2nd Edition)*. Addison-Wesley Professional. ISBN-13: 978-0-321-64741-2

5. R.A. Penfold. (2005). *How to Set Up Your New Computer.* Bernard Babani Publishing. ISBN-13: 978-0-85934-559-0

6. Richard M. Roberts. (2008). *Computer Service and Repair: A Guide to Upgrading, Configuring, Troubleshooting, and Networking Personal Computers* (3rd). Goodheart-Willcox C. ISBN-13: 978-1-59070-857-6

7. Robert B J Warnar (2012). *Computer Peripheral Memory System Forecast* (Volume 500-545). General Books. ISBN-13: 978-1-235-71266-1

CURRICULUM of COMPETENCY UNIT (CoCU)

SECTOR	**INFORMATION COMMUNICATION TECHNOLOGY**						
SUB SECTOR	**INFRASTRUCTURE SUPPORT**						
JOB AREA	**END-USER COMPUTING**						
NOSS TITLE	**COMPUTER SYSTEM OPERATION**						
COMPETENCY UNIT TITLE	**SERVER INSTALLATION**						
LEARNING OUTCOME	The person who is competent in this CU shall be able to assemble server hardware and peripheral and install the software in accordance with server installation procedure. Upon completion of this competency unit, trainees will be able to: - • Analyse job order / change request • Execute hardware installation • Carry out software installation • Perform server functionality test • Prepare server installation set-up report						
COMPETENCY UNIT ID	**IT-020-3:2013-C04**	**LEVEL**	3	**TRAINING DURATION**	240 HOURS	**CREDIT HOURS**	24

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Analyse job order / change request	i. Type of server: • Database server • File server • Mail server • Print server • Web server ii. Type of server Operating system: • Licensed			11 hours	Lecture	i. Types of server to be set-up, operating system and software identified ii. Server configuration

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Open source iii. Server configuration details : • Server host name • Network address configuration (IP address, DNS, Gateway, subnet mask) • Security configuration (firewall setting, administrator privilege) iv. Types of server software • Anti-virus • Hardware drivers v. Server peripherals • Monitor • Key board vi. Tools and materials					setting interpreted vii. Server peripheral identified iii. Tools and materials prepared
		i. Identify types of server to be set-up, operating system and software ii. Define server configuration setting iii. Identify server peripherals		25 hours	Demonstration, practical and case study	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		iv. Prepare tools and material	*Attitude:* i. Detail and precise in identifying server operating system, server configuration detail and server peripherals *Safety/Environment*: i. Adhere to company security policy			
2. Execute hardware installation	i. Types of server form factor • tower unit, • rack mount unit, • blade unit ii. Server handling procedure according to types of server • tower unit, • rack mount unit, • blade unit iii. Server components iv. Server hardware components			29 hours	Lecture	i. Types of server hardware identified ii. Server hardware component compatibility checked iii. Server hardware components installed iv. Server power

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	compatibility. • Minimum OS requirement • Server hardware specification v. Hardware installation • Cable connectivity - power, - display, - network, - keyboard, - mouse) • Rack mount					initialisation carried out v. Server handling procedure applied when unpack and arrange server components
		i. Identify types of server hardware ii. Unpack and arrange server hardware components iii. Check server hardware components compatibility iv. Install server hardware components v. Carry out server power initialisation vi. Apply server handling procedure when unpack and arrange server components		67 hours	Demonstration and practical	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			Attitude: i. Thorough in checking hardware component compatibility *Safety/Environment*: i. Adhere to server handling procedure ii. Handle server with care during server unpack			
3. Carry out software installation	i. Operating system installation ii. Installation, configuration and testing of device drivers • Version • Compatibility • firmware iii. Configuration of server parameter: • Server host name • Network address configuration - IP address			22 hours	Lecture	i. Server Operating system installation performed ii. Device drivers installed, configured and tested iii. Server parameters configuration setting carried out

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	- DNS - Gateway - subnet mask • Security configuration - firewall setting - administrator - privilege iv. Operating system patches installation and testing • Security bulletin v. Server security configuration • Firewall configuration • User access control • Admin privilege vi. Server initialisation vii. Operation status inspection					iv. operating system patches installed and tested v. Server security configuration carried out vi. Server initialisation performed vii. Server operation status inspected
		i. Perform server operating system installation ii. Install, configure and test device drivers iii. Carry out server parameters configuration setting		50 hours	Demonstration and practical	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		iv. Install and test operating system patches v. Carry out server security configuration vi. Perform server initialisation vii. Inspect server operation status	*Attitude:* i. Meticulous and accurate in carrying out installation and configuration *Safety/Environment*: i. Handle server with care during software installation			
4. Perform server functionality test	i. Server status verification: • Power boot cycle status • Anti-virus protection status • Network connectivity status			7 hours	Lecture	i. Server status verified • Power boot cycle • Anti-virus protection status • Network connectivity status

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		i. Verify server status • Power boot cycle status • Anti-virus protection status • Network connectivity status	*Attitude:* i. Thorough in conducting server status verification *Safety/Environment*: i. Adhere to manufacturer instruction	17 hours	Demonstration and practical	
5. Prepare server installation set-up report	i. Documentation of server configuration information • Server network configuration detail • Admin information ii. Company asset documentation: • Types of asset: - Operating system - software, - drivers - Data backup - Warranty cards			4 hours	Lecture	i. Company asset listed out and documented ii. Final as-built diagram prepared iii. Electrical schematic diagram prepared

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	iii. Final as-built diagram iv. Electrical schematic diagram v. Server installation job order / change request report					iv. Computer set-up checklist recorded v. Inventory record updated vi. Server installation job order / change request produced.
		i. Carry out company asset documentation ii. Prepare final as-built diagram iii. Prepare electrical schematic diagram iv. Record computer set-up checklist v. Update Inventory record vi. Produce server installation job order / change request report.	*Attitude:* i. Precise in updating inventory record ii. Accurate in preparing final as-build diagram *Safety/Environment*: i. Adhere to company policy	8 hours	Demonstration and case study	

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information. 01.02 Document information procedures or processes. 01.03 Utilize basic IT applications. 02.01 Interpret and follow manuals, instructions and SOP's. 02.03 Communicate clearly. 02.04 Prepare brief reports and checklist using standard forms. 03.01 Apply cultural requirement to the workplace. 03.02 Demonstrate integrity and apply practical practices. 03.03 Accept responsibility for own work and work area. 03.05 Demonstrate safety skills. 03.06 Respond appropriately to people and situations. 03.07 Resolve interpersonal conflicts. 06.01 Understand systems. 06.02 Comply with and follow chain of command. 06.03 Identify and highlight problems. 06.04 Adapt competencies to new situations/systems. 01.04 Analyse information. 01.05 Utilize the Internet to locate and gather information. 01.06 Utilize word processor to process information. 03.08 Develop and maintain a cooperation within work group. 04.01 Organize own work activities. 04.02 Set and revise own objectives and goals. 04.03 Organize and maintain own workplace. 04.04 Apply problem solving strategies. 04.05 Demonstrate initiative and flexibility. 06.05 Analyse technical systems. 06.06 Monitor and correct performance of systems. 01.11 Apply thinking skills and creativity. 02.10 Prepare reports and instructions. 02.11 Convey information and ideas to people. 03.13 Develop and maintain team harmony and resolve conflicts. 03.14 Facilitate and coordinate teams and ideas.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Leadership skills 5. Learning skills 6. Multitasking and prioritizing 7. Self-discipline 8. Teamwork

Core Abilities	Social Skills
03.15 Liaise to achieve identified outcomes. 03.16 Identify and assess client/customer needs. 04.07 Negotiate acceptance and support for objectives and strategies. 05.01 Implement project/work plans.	

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1) LCD Projector	1:25
2) Laptop/PC	1:25
3) Server hardware components • Processor • Mother board • Network card • Memory module • Graphic card • Power supply • Hard disk • Storage media • Optical drive • Casing • Heat sink • Thermal paste	1:25
4) Server Operating system and software driver	1:25
5) Computer cable connector, such as: • Network connector RJ45 • Phone connector RJ11	1:5

6) Connector orientation: • Power cable • USB (1.1, 2.0, 3.0) • Monitor cable • Network cable (RJ45) 7) Electrostatic precaution 8) Server system set-up tools: • screw driver, • multi meter • anti-electrostatic wristband • Vacuum cleaner 9) Sample of as-built diagram 10) Sample of electrical schematic diagram 11) Sample of computer set-up checklist 12) Sample of inventory record 13) Sample of server installation job order /change request	1:5 1:5 1:5 1;1 1;1 1;1 1;1 1;1

REFERENCES

1. Books, Hephaestus (2011) . *Computer Peripherals, Including: Computer Monitor, Fax, Hard Disk Drive, Stored Energy Printer, Peripheral, Plug and Play, Auto-Configuration, Game Port, Hot Swapping, Autodetection, Surge Protector, Remote Terminal Unit*,. Western Digital Media Center. Hephaestus Books, Lightning Source Uk Ltd. ISBN-13: 978-1-242-97956-9

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CURRICULUM of COMPETENCY UNIT (CoCU)

SECTOR	**INFORMATION COMMUNICATION TECHNOLOGY**						
SUB SECTOR	**INFRASTRUCTURE SUPPORT**						
JOB AREA	**END-USER COMPUTING**						
NOSS TITLE	**COMPUTER SYSTEM OPERATION**						
COMPETENCY UNIT TITLE	**SERVER MAINTENANCE**						
LEARNING OUTCOME	The person who is competent in this CU shall be able to inspect server operating environment, inspect server utilisation status, conduct server data back-up, inspect server systems logs, and inspect server Antivirus software logs in accordance with company policy. Upon completion of this competency unit, trainees will be able to: - • Analyse server maintenance job order • Carry out hardware maintenance • Perform server Operating System maintenance • Prepare server maintenance report						
COMPETENCY UNIT ID	**IT-020-3:2013-C05**	**LEVEL**	3	**TRAINING DURATION**	180 HOURS	**CREDIT HOURS**	18

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Analyse server maintenance job order	i. Server information • server TAG/ID • server Specification • Operating System • Server Warranty information • Server maintenance contract status • Server operating and service manual • Server peripheral			8 hours	Lecture	i. Server information assessed ii. Types of maintenance indentified iii. Server security procedure interpreted

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	ii. Types of maintenance: • Preventive • Corrective iii. Server security procedure • Server access pass • server user ID • Password iv. Server maintenance tools • Vacuum cleaner • Cable tie, • Screw drivers					
		i. Asses Server information • server TAG/ID • server Specification • Operating System • Server Warranty information • Server maintenance contract status • Server operating and service manual • Server peripheral		19 hours	Demonstration, practical and case study	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		ii. Identify types of server maintenance iii. Interpret server security procedure iv. Prepare server maintenance tools	*Attitude:* i. Detail and through in assessing server information ii. Analytical mind when interpreting server maintenance procedure *Safety/Environment* i. Adhere to company server security procedure			
2. Carry out hardware maintenance	i. Server room requirement • Room temperature • Humidity - Dry - sign of water drop - water leak • Physical safety and			24 hours	Lecture	i. server environment maintained • Room temperature • Humidity • Physical safety and security

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	security - Access door lock - server rack door lock • Cables arrangement and connection • Cleanliness ii. Inspection of server peripheral • Uninterrupted Power Supply-UPS • Storage Area Network –SAN • Backup Device iii. Server Light Emitting Diode (LED) status indicator • Power ON/OFF indicator • HDD activity indicator • Fault indicator • RAID status indicator • Network connectivity indicator • LED indicator blinking pattern • LED indicator colour - Green, - Amber,					• Cables arrangement and connection • Server cables connection • Cleanliness ii. Server peripheral inspected iii. Server Light Emitting Diode (LED) status indicator inspected iv. Server cleaning tools and material identified

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	- Yellow, - Red, - Blue iv. Server cleaning tools and material: • Vacuum cleaner • Cloth v. Safety procedure vi. Manufacturer's operating manual					
		i. Maintain server environment • Room temperature • Humidity • Physical safety and security • Cables arrangement and connection • Server cables connection • Cleanliness ii. Check server peripheral iii. Inspect Server Light Emitting Diode (LED) status indicator • Power ON/OFF indicator • HDD activity indicator • Fault indicator		57 hours	Demonstration and practical	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		• RAID status indicator • Network connectivity indicator • LED indicator blinking pattern • LED indicator colour (Green, Amber, Yellow, Red, Blue) • Manufacturer's operating manual iv. Identify server cleaning tools and material	*Attitude:* i. Care to server room environment ii. Thorough when inspecting LED status indicator *Safety/Environment* i. Adhere to company server security procedure ii. Adhere to Manufacturer operating manual			

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
3. Perform server Operating System maintenance	i. Server utilisation status • Hard disk space utilization - Used, - Free - Total size • Memory usage - Physical RAM, - Virtual, - Shared memory • Central Processing Unit (CPU) usage • Network usage ii. Server data back-up • Type of backup - Full back-up - Incremental back-up • Backup media/devices - internal storage - external media • Backup software iii. Server backup status verification • Task completion status • Location, date and backup name • Backup logs file			16 hours	Lecture	i. Server utilisation status interpreted ii. Server operating system error rectified iii. Server data back-up performed iv. Server system logs assessed v. Server system status indicator (LEDs) interpreted vi. Critical error/alert from server system logs inspected vii. Critical Operating System patches availability assessed

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	iv. Types of Server system logs • Security Log • Application Log • System Log • Log level differences - Information - Warning - Alert • Log files location base on OS type v. Server system status indicator (LEDs) • LED indicator - blinking pattern • LED indicator colour - Green - Amber, - Yellow, - Red, - Blue vi. Types of server system log critical error/alert • System error - hardware failure, - OS vulnerability alert, - OS service					viii. Server Antivirus software logs checked ix. Server hardware error/faulty rectified x. Server maintenance cost estimated

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	failure • Security alert - antivirus pattern outdated - security threats - password expiry vii. Critical Operating System patches availability • OS patch • security bulletin information viii. Types of Server Antivirus software logs • Antivirus update log • Antivirus scan log • Threat log • Product/license expiry date ix. Server hardware error/faulty: • Server TAG number • List of errors • Warranty status x. Information on server Operating System error • Server TAG number • List of errors • Warranty status					

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	xi. Server maintenance costing					
		i. Interpret and record server utilisation status ii. Rectify server Operating System error iii. Perform server data back-up iv. Asses server system logs v. Interpret server system status indicator (LEDs) vi. Inspect critical error/alert from server system logs vii. Asses critical operating system patches availability viii. Check server antivirus software logs ix. Identify server hardware error/faulty x. Estimate server maintenance cost	*Attitude:* i. Detail and through in assessing server system logs ii. Accurate in rectifying server	38 hours	Demonstration and practical	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			hardware faulty iii. Thorough when interpret LED status indicator iv. Cost conscious when estimated maintenance cost *Safety/Environment* i. Adhere to company server security procedure ii. Adhere to Manufacturer operating manual			
4. Prepare server maintenance report	i. Types of Server Maintenance Record: • Server utilisation status record • Critical error/alert from server system logs Record • Critical error/alert from server system logs Record • Server hardware error/faulty • Server Operating System error			5 hours	Lecture	i. Server maintenance record updated • Server utilisation status • Critical error/alert from server system logs • Critical error/alert from server system logs • Server hardware error/faulty

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		i. Update Server maintenance record • Server utilisation status • Critical error/alert from server system logs • Critical error/alert from server system logs • Server hardware error/faulty • Server Operating System error	*Attitude:* i. Transparent and detail in updating server maintenance record *Safety/Environment*: i. Adhere to company confidentiality policy	13 hours	Demonstration and case study	• Server Operating System error

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information. 01.02 Document information procedures or processes. 02.01 Interpret and follow manuals, instructions and SOP's. 02.03 Communicate clearly. 02.04 Prepare brief reports and checklist using standard forms. 03.01 Apply cultural requirement to the workplace. 03.02 Demonstrate integrity and apply practical practices. 03.03 Accept responsibility for own work and work area. 03.05 Demonstrate safety skills. 03.06 Respond appropriately to people and situations. 03.07 Resolve interpersonal conflicts. 06.01 Understand systems. 06.02 Comply with and follow chain of command. 06.03 Identify and highlight problems. 06.04 Adapt competencies to new situations/systems. 01.04 Analyse information. 01.05 Utilize the Internet to locate and gather information. 03.08 Develop and maintain a cooperation within work group. 04.01 Organize own work activities. 04.02 Set and revise own objectives and goals. 04.03 Organize and maintain own workplace. 04.04 Apply problem solving strategies. 04.05 Demonstrate initiative and flexibility. 06.05 Analyse technical systems. 06.06 Monitor and correct performance of systems. 01.11 Apply thinking skills and creativity. 02.10 Prepare reports and instructions. 02.11 Convey information and ideas to people. 03.13 Develop and maintain team harmony and resolve conflicts.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Leadership skills 5. Learning skills 6. Multitasking and prioritizing 7. Self-discipline 8. Teamwork

Core Abilities	Social Skills
03.14 Facilitate and coordinate teams and ideas. 03.15 Liaise to achieve identified outcomes. 03.16 Identify and assess client/customer needs. 04.07 Negotiate acceptance and support for objectives and strategies. 05.01 Implement project/work plans.	

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1) LCD Projector	1:25
2) Laptop/PC	1:25
3) Server hardware components • Processor • Mother board • Network card • Memory module • Graphic card • Power supply • Hard disk • Storage media • Optical drive • Casing • Heat sink • Thermal paste	1:25
4) Server Operating system and software driver	1:25
5) Electrostatic precaution	1:5
6) Server system set-up tools:	

• screw driver, • multi meter • Vacuum cleaner	1:5
7) Sample of SLA 8) Sample of server security procedure 9) Sample of Manufacturer Instruction Manual 10) Sample of server maintenance checklist	1;1 1:1 1:1 1;1

REFERENCES

1. Joseph L Jorden (2010). *Microsoft SQL Server 2005 Implementation and Maintenance*. John Wiley & Sons. ISBN-13: 978-0-470-76754-2

2. Rabah, Kefa (2012). *Red Hat Enterprise Linux (Rhel) 6 Server nstallation & Administration.* Lap Lambert Academic Publishing, ISBN-13: 978-3-8465-1118-3

3. Sharon Crawford, Charlie Russel (2008*). Windows Server 2008*. Microsoft Press. ISBN-13: 978-0-7356-2505-1

4. Steve Silva (2008). *Web Server Administration* (1st Edition). Course Technology Ptr. ISBN-13: 978-1-4239-0323-9

5. Tim Parks (2012). *Server.* Harvill Secker. ISBN-13: 978-1-84655-577-0

CURRICULUM of COMPETENCY UNIT (CoCU)

SECTOR	**INFORMATION COMMUNICATION TECHNOLOGY**						
SUB SECTOR	**INFRASTRUCTURE SUPPORT**						
JOB AREA	**END-USER COMPUTING**						
NOSS TITLE	**COMPUTER SYSTEM OPERATION**						
COMPETENCY UNIT TITLE	**COMPUTER NETWORK CONNECTIVITY SET-UP**						
LEARNING OUTCOME	The person who is competent in this CU shall be able to set connectivity among computers and devices so that they could link and communicate each other for information sharing and workplace operation. Upon completion of this competency unit, trainees will be able to: - • Analyse computer network connectivity configuration specification • Carry out computer network connectivity configuration • Perform computer network connectivity test • Carry out computer network connectivity troubleshoot • Prepare computer network connectivity report						
COMPETENCY UNIT ID	**IT-020-3:2013-C06**	**LEVEL**	3	**TRAINING DURATION**	120 HOURS	**CREDIT HOURS**	12

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Analyse computer network connectivity configuration specification	i. Types of computer network connectivity: • LAN • WAN • MAN ii. Wireless technology • WIFI • WIMAX			7 hours	Lecture	i. Types of computer network connectivity identified ii. Wireless technology defined

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Mobile iii. Types of computer peripheral • Network Interface Card (NIC) • Scanner • Server • Printer / multifunction • Computer / PC • Wireless devices iv. Computer peripheral drivers v. Network installation equipment • Equipment • Main distribution frame - Switch - Router - Access Point • Patch panel • Patch cord • RJ 45 Faceplate					iii. Types of computer peripheral and its driver identified iv. Network installation equipment prepared
		i. Identify types of computer network connectivity to ii. Identify wireless technology		17 hours	Demonstration, practical and case study	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		iii. Identify types of computer peripheral and its driver iv. Prepare network installation equipment	*Attitude:* i. Precise and through in identifying network connectivity ii. Meticulous in identifying computer system peripherals *Safety/Environment* i. Adhere to company policy			
2. Carry out computer network connectivity configuration	i. IP address • Subnet Mask • Gateway • Domain Name Server (DNS) ii. Network Interface Card (NIC) installation and connection • Computer / PC • Server • Scanner • Printer / multifunction			9 hours	Lecture	i. Network Interface Card (NIC) installation carried out ii. RJ 45 cable connected into NIC iii. NIC driver installed into computer and peripherals

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
						iv. IP addresses configured
		i. Carry out Network Interface Card (NIC) installation ii. Connect RJ 45 cable into NIC iii. Install NIC driver into computer and peripherals iv. Configure IP addresses	*Attitude:* i. Meticulous in connecting RJ cable and installing NIC ii. Accurate in carrying out IP configuration *Safety/Environment* i. Adhere to company security policy	21 hours	Demonstration and practical	
3. Perform computer network connectivity test	i. Computer network connectivity test • Ping test • Tracert test • Internet browser application test • Print-out test			7 hours	Lecture	i. Network testing carried out: • Ping test • Tracert test • Internet browser

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Scanning test • Wireless Authentication test • wireless connectivity test ii. User Acceptance Test (UAT)					application test • Print-out test • Scanning test • Wireless Authentication test • wireless connectivity test ii. UAT executed
		i. Carry out network testing: • Ping test • Tracert test • Internet browser application test • Print-out test • Scanning test • Wireless Authentication test • wireless connectivity test ii. Execute UAT	<u>*Attitude:*</u> i. Precise and systematic in performing computer network connectivity test	17 hours	Demonstration and practical	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
			Safety/Environment i. Adhere to company policy			
4. Carry out computer network connectivity troubleshoot	i. NIC Light Emitting Diode (LED) indicator • No light • Light ii. Symptom/ problem • Crimping failure • NIC Driver wrongly installed • Cable failure • OS compatibility • Hardware compatibility			9 hours	Lecture	i. NIC Light Emitting Diode (LED) indicator interpreted ii. Network connectivity symptom/ problem diagnosed • Crimping failure • NIC Driver • Cable failure • OS compatibility • Hardware compatibility
		i. Interpret NIC Light Emitting Diode (LED) indicator ii. Diagnose network connectivity symptom/ problem • Crimping failure • NIC Driver • Cable failure		21 hours	Demonstration and practical	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		• OS compatibility • Hardware compatibility	*Attitude:* i. Detail and thorough when diagnose network connectivity symptom *Safety/Environment* i. Adhere to company policy			
5. Prepare computer network connectivity report	i. Network connectivity testing report iii. UAT status report ii. Network connectivity set-up documentation • Configuration • Drivers • Compatibility			4 hours	Lecture	i. Network connectivity testing report prepared ii. UAT status report prepared iii. Network connectivity set-up documentation carried out • Network configuration manual
		i. Produce network connectivity testing report ii. Prepare UAT status report iii. Carry out network		8 hours	Demonstration and case study	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		connectivity set-up documentation • Prepare network configuration manual • Record and label drivers • Prepare compatibility record	*Attitude:* i. Transparent and detail in preparing computer system maintenance report *Safety/Environment*: i. Adhere to company confidentiality policy and record management procedure			prepared • Drivers labelled and recorded • compatibility recorded

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information. 01.02 Document information procedures or processes. 02.01 Interpret and follow manuals, instructions and SOP's. 02.03 Communicate clearly. 02.04 Prepare brief reports and checklist using standard forms. 03.01 Apply cultural requirement to the workplace. 03.02 Demonstrate integrity and apply practical practices. 03.03 Accept responsibility for own work and work area. 03.05 Demonstrate safety skills. 03.06 Respond appropriately to people and situations. 03.07 Resolve interpersonal conflicts. 06.01 Understand systems. 06.02 Comply with and follow chain of command. 06.03 Identify and highlight problems. 06.04 Adapt competencies to new situations/systems. 01.04 Analyse information. 01.05 Utilize the Internet to locate and gather information. 03.08 Develop and maintain a cooperation within work group. 04.01 Organize own work activities. 04.02 Set and revise own objectives and goals. 04.03 Organize and maintain own workplace. 04.04 Apply problem solving strategies. 04.05 Demonstrate initiative and flexibility. 06.05 Analyse technical systems. 06.06 Monitor and correct performance of systems. 01.11 Apply thinking skills and creativity. 02.10 Prepare reports and instructions. 02.11 Convey information and ideas to people. 03.13 Develop and maintain team harmony and resolve conflicts. 03.14 Facilitate and coordinate teams and ideas. 03.15 Liaise to achieve identified outcomes.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Leadership skills 5. Learning skills 6. Multitasking and prioritizing 7. Self-discipline 8. Teamwork

Core Abilities	Social Skills
03.16 Identify and assess client/customer needs. 04.07 Negotiate acceptance and support for objectives and strategies. 05.01 Implement project/work plans.	

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1) LCD Projector	1:25
2) Laptop/PC	1:25
3) Computer peripheral	1:5
• Network Interface Card (NIC)	
• Scanner	
• Printer / multifunction	
• Computer / PC	
• Server	
• Wireless devices	
4) Computer peripheral drivers	1:5
5) Switch	1:25
6) Router	1:25
7) Access Point	1:25
8) Patch panel	1:5
9) Patch cord	1:5
10) RJ 45 Faceplate	

11) Sample of network connectivity testing report 12) Sample of UAT status report 13) Sample of Network connectivity set-up documentation 14) Sample of Network configuration manual 15) Sample of compatibility record	1;1 1;1 1;1 1;1 1;1

REFERENCES

1. Books, Hephaestus (2011) . *Computer Peripherals, Including: Computer Monitor, Fax, Hard Disk Drive, Stored Energy Printer, Peripheral, Plug and Play, Auto-Configuration, Game Port, Hot Swapping, Autodetection, Surge Protector, Remote Terminal Unit*,. Western Digital Media Center. Hephaestus Books, Lightning Source Uk Ltd. ISBN-13: 978-1-242-97956-9

2. Jyoti Snehi. (2006). *Computer Peripherals and Interfacing. Firewall Media.* ISBN-13: 978-81-7008-929-2

3. R.A. Penfold. (2005). *How to Set Up Your New Computer.* Bernard Babani Publishing ISBN-13: 978-0-85934-559-0

4. Robert B J Warnar (2012). *Computer Peripheral Memory System Forecast* (Volume 500-545). General Books. ISBN-13: 978-1-235-71266-1

CURRICULUM of COMPETENCY UNIT (CoCU)

SECTOR	**INFORMATION COMMUNICATION TECHNOLOGY**						
SUB SECTOR	**INFRASTRUCTURE SUPPORT**						
JOB AREA	**END-USER COMPUTING**						
NOSS TITLE	**COMPUTER SYSTEM OPERATION**						
COMPETENCY UNIT TITLE	**MOBILE DEVICE CONFIGURATION**						
LEARNING OUTCOME	The person who is competent in this CU shall be able to configure and troubleshoots mobile computer and its devices and prepare safe and sound environment for mobile device to connect with computer system network in accordance with company SOP. Upon completion of this competency unit, trainees will be able to: - • Analyse job order/ change request • Carry out mobile device configuration • Perform out mobile device troubleshoot • Carry out mobile device commissioning						
COMPETENCY UNIT ID	**IT-020-3:2013-C07**	**LEVEL**	3	**TRAINING DURATION**	60 HOURS	**CREDIT HOURS**	6

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Analyse job order/ change request	i. Network accessibility needs • Type of connection - WiFi, - Cellular, - Bluetooth, - NFC Near Field Communication - Infrared, - USB • Duration - on-demand			5 hours	Lecture	i. Network accessibility needs assessed ii. Network accessibility purpose identified iii. Mobile device specification assessed

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	- frequent • Location - local, - remote area - overseas ii. Network accessibility purpose • Email & messaging • Web browsing • Voice-Over IP • Tele-conference • Access company resources (server, printer) • Document collaboration • File sharing • Tele-marketing • Remote support • Navigation iii. Types of mobile device and device specification • Device Type - Mobile phone (Smartphone) - Tablet - PDA (Personal Digital Assistant) - Pager - Navigation device • Device Specification - Device maker /					iv. Mobile application software evaluated v. Mobile application compatibility assessed

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	brand / model - RAM capacity - Storage size - Screen display type - Input method - Connectivity - OS and OS version iv. The required mobile application information • Type of application and software • Software licenses • Software version v. Mobile application compatibility • Minimum device hardware & software installation requirement • OS and software version • Security setting requirement • Network availability / coverage					
		i. Assess network accessibility needs ii. Identify network accessibility purpose iii. Asses mobile device		11 hours	Lecture	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		specification iv. Evaluate mobile device software and application v. Asses mobile application compatibility	<u>*Attitude:*</u> i. Detail in assessing network accessibility needs and mobile device specification ii. Thorough in evaluating mobile application compatibility <u>*Safety/Environment*</u> i. Adhere to company procedure			
2. Carry out mobile device configuration	i. Mobile device configuration setting • Device setting menu • Network configuration - IP address - Authentication • Network testing and troubleshooting ii. Mobile application			6 hours	Lecture	i. Mobile device setting configuration carried out ii. Mobile application installed and configured

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	installation and configuration procedure iii. Mobile device configuration testing • Authentication test • Network accessibility and communication test • Application test iv. Security setting configuration • Device OS security • User's account security • Network/access security v. Company security policy					iii. Mobile device security setting configured iv. Mobile device configuration testing carried out
		i. Carry out mobile device setting configuration ii. Install and configure mobile application iii. Configure mobile device security setting • Device OS security • User's account security • Network/access security iv. Carry out mobile device		15 hours	Demonstration and practical	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
		configuration test • Authentication test • Network accessibility and communication test • Application test	*Attitude:* i. Detail and through when configure mobile device setting ii. Analytical mind and accurate when conducting configuration test *Safety/Environment* i. Adhere to company security procedure			
3. Perform mobile device troubleshoot	i. Types of Mobile device problems • Symptom, error messages and logs • Device functionality test ii. Troubleshoot action requirement • Device warranty information			5 hours	Lecture	i. Diagnose mobile device problem ii. User's data retrieval and back-up performed iii. Mobile device troubleshoot

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Authorize service centre • User schedule • Troubleshoot guideline and procedure • Data backup iii. User's data retrieval and back-up • Type of data - Personal - Official • Backup method • Backup location iv. Mobile device troubleshoot action • Hardware functionality test • Software removal, re-installation and re-configuration procedure v. Restoration of device's software, application and user's data vi. Mobile device operation testing • Hardware functionality test • Cellular/network access and communication test					executed iv. Device's software, application and user's data restored v. Mobile device operation testing carried out

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Software and application test					
		i. Diagnose mobile device problem ii. Perform user's data retrieval and back-up iii. Execute mobile device troubleshoot iv. Restore device's software, application and user's data v. Carry out mobile device operation testing	*Attitude:* i. Detail and through when diagnose mobile device problem ii. Analytical mind and accurate when performing mobile device troubleshoot *Safety/Environment* i. Adhere to company security procedure	13 hours	Demonstration and practical	

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
4. Carry out mobile device commissioning	i. Handing over of Mobile device and gadget to end-user • Device packing • Device handling procedure ii. User Acceptance test • Network and communication access test • software and application installation • Security and safety advice iii. Mobile device set-up documentation • User's information - name, - location, - department • Device information - IP address - User ID • Company resources accessed by the device - server, - printer,			2 hours	Lecture	i. User Acceptance Test performed ii. Mobile device documentation carried out iii. Company inventory updated iv. Job order / change request report produced

Work Activities	Related Knowledge	Related Skills	Attitude / Safety / Environmental	Training Hours	Delivery Mode	Assessment Criteria
	- application iv. Asset record • Company inventory update					
		i. Perform User Acceptance Test ii. Carry out mobile computer documentation iii. Update company inventory iv. Produce Job order / change request report	*Attitude:* i. Transparent and detail in preparing mobile devices set-up report ii. Accountable in updating company inventory *Safety/Environment*: i. Adhere to company confidentiality policy	4 hours	Demonstration and practical	

Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information. 01.02 Document information procedures or processes. 02.01 Interpret and follow manuals, instructions and SOP's. 02.02 Follow telephone/telecommunication procedures. 02.03 Communicate clearly. 02.04 Prepare brief reports and checklist using standard forms. 03.01 Apply cultural requirement to the workplace. 03.02 Demonstrate integrity and apply practical practices. 03.03 Accept responsibility for own work and work area. 03.05 Demonstrate safety skills. 03.06 Respond appropriately to people and situations. 03.07 Resolve interpersonal conflicts. 06.01 Understand systems. 06.02 Comply with and follow chain of command. 06.03 Identify and highlight problems. 06.04 Adapt competencies to new situations/systems. 01.04 Analyse information. 01.05 Utilize the Internet to locate and gather information. 02.07 Utilize Local Area Network (LAN)/Intranet to exchange information. 02.08 Prepare pictorial and graphic information. 03.08 Develop and maintain a cooperation within work group. 04.01 Organize own work activities. 04.02 Set and revise own objectives and goals. 04.03 Organize and maintain own workplace. 04.04 Apply problem solving strategies. 04.05 Demonstrate initiative and flexibility. 06.05 Analyse technical systems. 06.06 Monitor and correct performance of systems. 01.11 Apply thinking skills and creativity. 02.10 Prepare reports and instructions. 02.11 Convey information and ideas to people. 03.13 Develop and maintain team harmony and resolve conflicts.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Leadership skills 5. Learning skills 6. Multitasking and prioritizing 7. Self-discipline 8. Teamwork

Core Abilities	Social Skills
03.14 Facilitate and coordinate teams and ideas. 03.15 Liaise to achieve identified outcomes. 03.16 Identify and assess client/customer needs. 04.07 Negotiate acceptance and support for objectives and strategies. 05.01 Implement project/work plans.	

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1) LCD Projector 2) Laptop/PC 3) Mobile device • Mobile phone (Smartphone) • Tablet • PDA (Personal Digital Assistant) • Pager 4) Mobile devices Operating System and software 5) Sample of manufacturer instruction manual 6) Sample of company inventory report 7) Sample of job order / change request report	1:25 1:25 1:15 1:15 1:1 1:1 1;1

REFERENCES

1. Amjad Umar (2004). *Mobile Computing And Wireless Communications*. Nge Solutions ISBN-13: 978-0-9759182-0-3
2. Chander Dhawan (1997). *Mobile Computing: A Systems Integrator's Handbook (1st). Mcgraw-Hill Companies.* ISBN-13: 978-0-07-016769-8
3. Lynn Wright (editor) (2011). *Laptops and Mobile Devices Made Easy. Books*. SBN-13: 978-1-84490-117-3
4. Raj Kamal (2008). *Mobile Computing. Oxford University* Press, USA. ISBN-13: 978-0-19-568677-7
5. Tilmann Bollmann (2010). Mobile Computing (1st Edition). W3l. ISBN-13: 978-3-86834-005-1

APPENDIX

CONTACT HOUR DISTRIBUTION
COMPUTER SYSTEM OPERATION - LEVEL 3

1200

	COMPETENCY UNIT	%	Hrs	WORK ACTIVITIES	%	Hrs	30% Knowledge 30% (HRS)	70% Performance 70% (HRS)	TOTAL
1	**COMPUTER SYSTEM SET-UP**	25.00%	300.00	Analyse job request/change order	10.00%	30	9.0	21.0	30.0
				Prepare computer set-up tools, computer hardware parts and computer software	15.00%	45	13.0	32.0	45.0
				Set-up computer hardware	30.00%	90	27.0	63.0	90.0
				Carry out computer software installation	20.00%	60	18.0	42.0	60.0
				Set-up computer peripherals	10.00%	30	9.0	21.0	30.0
				Carry out unit functionality test	10.00%	30	9.0	21.0	30.0
				Prepare computer system set-up report	5.00%	15	5.0	10.0	15.0
					100.00%	300	90.0	210.0	300.0
2	**COMPUTER SYSTEM MAINTENANCE**	10.00%	120.00	Identify computer maintenance requirements	15.00%	18.00	5.0	13.0	18.0
				Carry out computer scheduled preventive maintenance	40.00%	48.00	14.0	34.0	48.0
				Carry out computer corrective maintenance	40.00%	48.00	14.0	34.0	48.0
				Prepare computer maintenance report	5.00%	6.00	2.0	4.0	6.0
					100.00%	120.00	35.0	85.0	120.0
3	**COMPUTER SYSTEM REPAIR**	15.00%	180.00	Assess computer repair job order/ change request	10.00%	18.00	5.0	13.0	18.0
				Carry out online trouble shooting	30.00%	54.00	16.0	38.0	54.0
				Perform on-site repair	50.00%	90.00	27.0	63.0	90.0
				Prepare computer status report	10.00%	18.00	6.0	12.0	18.0
					100.00%	180.00	54.0	126.0	180.0
4	**SERVER INSTALLATION**	20.00%	240.00	Analyse job order / change request	15.00%	36.00	11.0	25.0	36.0
				Execute hardware installation	40.00%	96.00	29.0	67.0	96.0
				Carry out software installation	30.00%	72.00	22.0	50.0	72.0
				Perform server functionality test	10.00%	24.00	7.0	17.0	24.0
				Prepare server installation set-up report	5.00%	12.00	4.0	8.0	12.0
					100.00%	240.00	73.0	167.0	240.0

5	**SERVER MAINTENANCE**	15.00%	180.00	Analyse server maintenance job order	15.00%	27.00	8.0	19.0	27.0
				Carry out hardware maintenance	45.00%	81.00	24.0	57.0	81.0
				Perform server Operating System maintenance	30.00%	54.00	16.0	38.0	54.0
				Prepare server maintenance record	10.00%	18.00	5.0	13.0	18.0
					100.00%	180.00	53.0	127.0	180.0
6	**COMPUTER NETWORK CONNECTIVITY SET-UP**	10.00%	120.00	Analyse computer network connectivity configuration specification	20.00%	24.00	7.2	16.8	24.0
				Carry out computer network connectivity configuration	25.00%	30.00	9.0	21.0	30.0
				Perform computer network connectivity test	20.00%	24.00	7.2	16.8	24.0
				Carry out computer network connectivity troubleshoot	25.00%	30.00	9.0	21.0	30.0
				Prepare computer network connectivity report	10.00%	12.00	3.6	8.4	12.0
					100.00%	120.00	36.0	84.0	120.0
7	**MOBILE DEVICE CONFIGURATION**	5.00%	60.00	Analyse job order/ change request	25.00%	15.00	4.5	10.5	15.0
				Carry out mobile device configuration	35.00%	21.00	6.3	14.7	21.0
				Perform mobile device troubleshoot	30.00%	18.00	5.4	12.6	18.0
				Carry out mobile device commissioning	10.00%	6.00	1.8	4.2	6.0
					100.00%	60.00	18.0	42.0	60.0
							359.0	841.0	1200.0
	TOTAL	100.00%	1200.00						