



**National Competency Standards
for
“Computer Networking and Cloud Computing”
Lab Assistant (Network)
Level-2**



**National Vocational and Technical Training Commission (NAVTTTC),
Government of Pakistan**



ACKNOWLEDGEMENT

National Vocational and Technical Training Commission (NAVTTTC) extends its gratitude and appreciation to representatives of business, industry, academia, government agencies, provincial TEVTAs, sector skill councils and trade associations who spared time and extended their expertise for the development of National Vocational Qualifications for the trade of **Computer Networking and Cloud Computing**. This work would not have been possible without the technical support of the above personnel.

NAVTTTC initiated development of CBT&A based qualifications for 200 traditional / hi-tech trades under the Prime **Minister’s Hunarmand Pakistan Program**, focusing on Development & Standardization of 200 Technical & Vocational Education & Training (TVET) Qualifications. NAVTTTC efforts have received full support from the Ministry of Federal Education and Professional Training which highly facilitated progress under this initiative.

It may not be out of place to mention here that all the experts of Industry, Academia and TVET experts of TEVTAs, BTEs and PVTC work diligently for making this qualification worthy and error free for which all credit goes to them. However, NAVTTTC accepts the responsibility of all the errors and omissions still prevailing in the Qualification document.

It is also noteworthy that development of Skill Standards is a dynamic and ongoing process, and the developed skill standards needs periodic review and updating owing to the constant technological advancements, development in scientific knowledge, and growing experience of implementation at the grass root level as well as the demand of industry. NAVTTTC will ensure to keep the qualifications abreast with the changing demands of both national and international job markets.

**Dr. Nasir Khan,
Executive Director,
NAVTTTC**



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1. Introduction

In an enterprise, IT infrastructure is needed to provide employees with the necessary hardware and software to do their job. The key component of the IT infrastructure is the network that connects servers, desktop computers, and mobile devices. The IT infrastructure in an enterprise is a high-cost and high-maintenance unit. It requires expensive hardware and software and skilled IT service staff members to keep it running.

Cloud Computing is the delivery of computing services such as servers, storage, databases, networking, software, analytics, intelligence, and more, over the Cloud (Internet). Cloud computing has become the new trend in delivering business applications and services. The cloud is a cost-effective, flexible, reliable IT infrastructure to support e-commerce and e-learning. Cloud computing can also provide a collaboration platform for developers to participate in an application development project from anywhere and anytime. The cloud resources that are owned and operated by a third-party cloud service provider are termed as public clouds. It delivers computing resources such as servers, software, and storage over the internet. The cloud computing resources that are exclusively used inside a single business or organization are termed as a private cloud. A private cloud may physically be located on the company’s on-site datacenter or hosted by a third-party service provider. The combination of public and private clouds, which is bounded together by technology that allows data applications to be shared between them. Hybrid cloud provides flexibility and more deployment options to the business.

Since a cloud can be considered an online IT infrastructure, the network is also a key component of the cloud. Networking theories and practice have been widely used in cloud computing. To understand the usage of the cloud in an enterprise, one has to have a thorough understanding of networking theories and practice.

Being cognizant of this fact, National Vocational & Technical Training Commission (NAVTTTC) developed competency standards for Computer Networking and Cloud Computing under National Vocational Qualifications Framework (NVQF). These competency standards have been developed by a Qualifications Development Committee (QDC) and validated by the Qualifications Validation Committee (QVC) having representation from the leading development houses and research labs of the country.



2. Purpose of the Qualification

The competency based NVQ has been developed to train the unskilled men and women of Pakistan on the technical and entrepreneurial skills to be employed / self-employed and inevitably set sustainable impact on their lives by enhancing their livelihood income.

The purpose of these qualifications is to set professional standards for upcoming experts, who will serve as key elements enhancing quality of Pakistan’s networking, cloud computing & network security sector. The specific objectives of developing these qualifications are as under:

- Improve the professional competencies of individual in computer networking and cloud computing
- Capacitate the local community and trainers in modern CBT trainings, methodologies and processes as envisaged under NVQF
- Provide flexible pathways and progressions in computer networking and cloud computing
- Enable the trainees to perform their duties in efficient manner
- Establish a standardized and sustainable system of training in Pakistan
- Enabling the youth with greater employment opportunities



3. Date of Validation

The level 5 Computer networking and cloud computing qualification has been validated on 4th to 8th August, 2020 at PITAC, Lahore, by the qualification validation committee (QVC) members.

4. Date of Review

The level 2 in Computer networking and cloud computing qualification has been reviewed on 20th Dec 2021, by the qualification validation committee (QVC) members.

5. Codes of Qualifications

The International Standard Classification of Education (ISCED) is a framework for assembling, compiling and analyzing cross-nationally comparable statistics on education and training. ISCED codes for these qualifications are assigned as follows:

ISCED Classification	
Code	Description
061301	National Certificate of level-2 Qualification, in “Computer Networking & Cloud Computing “(Lab Assistant)

Entry Requirements

Entry requirement for this level 2 qualification would be middle



1. Members of Qualification Development Committee

The following members participated in the qualification development process at PITAC, Lahore.

Date: 6th to 10th July'2020

S#	Name	Designation
1.	Dr. Adnan Noor Mian	Professor – ITU, Lahore
2.	Muhammad Yasir	Deputy Director - NAVTTTC
3.	Kashif Babar	Manager – KICS, UET, Lhr
4.	Fahmeed Akram	Manager – KICS, UET, Lhr
5.	Engr. Tayyaba Amin	Sr. Instructor – Tevta, Lahore
6.	Imran Akhtar	Network Lecturer - PUCIT
7.	Mazhar Javed	Assistant Professor - UMT, Lahore
8.	Amir Amin	HOD Electrical – Malaysian Institute
9.	Hafiz M. Ishtiaq Rafique	Asst. Manager IT – ITU, Lahore
10.	Shoaib Bhatti	Manager IT – ITU, Lahore
11.	Ehtasham-ul-Haq	Administrator – LEADS
12.	Ayyaz Ahmed	Research Officer – KICS, UET Lahore
13.	Mushtaq Ahmed	AM (Trainings) – Tevta, Lahore
14.	Faisal Sarwar	PBTE Representative, Lahore
15.	Muhammad Hassaan	GIZ Consultant, Daccum Facilitator



2. Members of Qualification Validation Committee

The following members participated in the qualification development process at PITAC, Lahore.

Date: 4th to 8th August, 2020

S#	Name	Designation
1.	Dr. Adnan Noor Mian	Professor, ITU, Lahore
2.	Muhammad Yasir	Deputy Director - NAVTTC
3.	Hafiz M. Ishtiaq Rafique	Asst. Manager IT – ITU, Lahore
4.	Muhammad Akram	Regional Project Manager, ZTE, Faisalabad
5.	Aemal	Support Engineer, Oracle Pakistan
6.	Sumera Perveen	Instructor, GCTW, Bahawalpur
7.	Kashif Babar	Manager – KICS, UET, Lahore
8.	Muhammad Zubair	Manager Research, KICS, UET, Lahore
9.	Engr. Naseebullah	Lecturer IT – GPI Quetta
10.	Shoaib Bhatti	Manager Network, ITU, Lahore
11.	Hammad Ameer	Corvit System, Lahore
12.	Faisal Sarwar	PBTE Representative, Lahore
13.	Muhammad Hassaan	GIZ Consultant, DACUM Facilitator



3. Summary of Competency Standards

Sr No	Competency Standards	NVQF Level	Category	Estimated Hours			
				Th	Pr	Total	Cr Hr
Level 2		Lab Assistant (Network)					

1. Perform Basic Computer Installation	Level 2	Functional	13	45	58	5.8
2. Configure hardware components/peripheral devices	Level 2	Functional	15	33	48	4.8
3. Prepare office documents	Level 2	Functional	12	48	60	6
4. Perform internet surfing and email management	Level 2	Functional	15	45	60	6
5. Perform basic communication skills	Level 2	Generic	9	21	30	3
6. Perform installation and configuration of network cables	Level 2	Technical	12	51	63	6.3
7. Install configure and trouble shoot switch & router	Level 2	Technical	14	66	80	8
8. Install system software on the devices	Level 2	Technical	9	81	90	9
9. Configure Hardware Raid (Redundant Array of Independent Disk)	Level 2	Technical	12	69	81	8.1
10. Follow safety rules at site	Level 2	Generic	9	21	30	3
Total			120	480	600	60



4. Detail of Qualification and its Competency Standards

LEVEL 2

061301-A - Perform Basic Computer Installation

Overview: After this competency standard candidate will be able to install and configure system software / operating systems (windows/Linux) and resolve installation errors on computers. install, configure and upgrade application software on computers.

Competency Unit	Performance Criteria
CU1. Install system software	<p>P1. Prepare drive/partitions before OS installation.</p> <p>P2. Format mass storage on a PC/computer. Form Partitioning of hard drive</p> <p>P3. Perform Partitioning of hard drive</p> <p>P4. Install operating system in the PC/computers according to given instructional manual.</p> <p>P5. Trouble Shoot installation errors</p> <p>P6. Download and run windows/application patches</p>
CU2. Use operating system	<p>P1. Create folders and files</p> <p>P2. Copy files, folder/ directories to different location (Hard drive, external storage, cloud)</p> <p>P3. Move files, folder/ directories to different location (Hard drive, external storage, cloud)</p> <p>P4. Rename files and directories/folder</p> <p>P5. Search files / folder/directories against various search criterion (File name, date, text etc)</p> <p>P6. Perform task manager operations</p>

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes:



- Define different types of operating system
- Describe the OS Installation process
- Demonstrate how to apply Operating system updates/patches
- Differentiate between system software and application software.
- Describe Installation process of application software
- Define the benefits of software upgradation

Tools and Equipment

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Computer System
2.	Internet Connection
3.	Web Browser
4.	Search Engines
5.	Internet or Intranet Connectivity
6.	UPS
7.	Operating System (Windows,Linux)

Critical Evidence(s) Required

The candidate needs to produce following **Critical Evidence(s)** in order to be competent in this competency standard:

- Install operating system
- Resolve Installation errors.
- Install application software
- Install and run antivirus software
- Uninstall application software



061301-B Configure Hardware Components/Peripheral Devices

Overview: After this competency standard candidate will be able to install and configure and trouble shoot hardware components/peripheral devices and device drivers on computers

Competency Unit	Performance Criteria
CU1. Install / configure Hardware components / peripheral devices	P1. Configure hardware components / peripheral devices as per manuals. P2. Select and install drivers. P3. Perform functional test for the installed Hardware components / peripheral devices. P4. Update/Upgrade device driver
CU2. Troubleshoot basic hardware errors	P1. Detect hardware errors/problems. P2. Identify solution of hardware errors. P3. Execute the hardware troubleshooting.

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes:

- Understands OHS policies and procedures in the carrying out the work.
- Understand hardware components / devices drivers
- Knowledge of Trouble shooting installation problems/errors.

Tools and Equipment

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Computer System
2.	Internet Connection
3.	Web Browser



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4.	Search Engines
5.	LAN Connectivity
6.	UPS
7.	Printer
8.	Scanner
9.	Web cam (digital camera)
10.	DVD or BLU-RAY writer
11.	Pen-drive
12.	External Hard disks
13.	Operating System (Windows, Linux)

Critical Evidence(s) Required

The candidate needs to produce following **Critical Evidence(s)** in order to be competent in this competency standard:

- Install device drivers
- Trouble shoot Hardware errors.



061301-C Prepare Office Documents

Overview: After this competency standard candidate will be able to prepare office documents, take offline and online backups, perform files conversions efficiently.

Competency Unit	Performance Criteria
CU1. Prepare document on word	<p>P1. Create new document / open word document</p> <p>P2. Save document</p> <p>P3. Set page Layout</p> <p>P4. Perform basic Formatting (text, paragraph, page)</p> <p>P5. Perform insert operation (picture, shapes, charts, tables, smart art, clip art, hyperlinks, page numbers, header/footers, bullets/numbering, columns) in the word document</p> <p>P6. Check the spellings in the word file through dictionary</p> <p>P7. Print document</p>
CU2. Prepare spreadsheet	<p>P1. Create / open Spread Sheet</p> <p>P2. Save Spreadsheet</p> <p>P3. Set page Layout</p> <p>P4. Perform basic Formatting</p> <p>P5. Perform insert operation (picture, charts, smart art, clip art, hyperlinks, page numbers, header/footers, bullets / numbering) in the spread sheet</p> <p>P6. Insert / use arithmetic functions/formulas</p> <p>P7. Print Spreadsheet</p>
CU3. Prepare presentation	<p>P1. Create / open presentation</p> <p>P2. Save presentation</p> <p>P3. Set page Layout</p> <p>P4. Perform basic Formatting</p> <p>P5. Perform insert operation (slides, picture, shapes, charts, tables, smart art, clip art, hyperlinks, page numbers, bullets/numbering) in the presentation.</p> <p>P6. Select various template designs</p> <p>P7. Apply animation to slides</p> <p>P8. Check the spellings in the presentation through available dictionary</p>



	P9. Run presentation P10. Print presentation
CU4. Convert files into different formats	P1. Identify file conversion software P2. Convert files into different formats P3. Use online convertor to give a practical demonstration

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes:

- Demonstrate proficiency in creating a Word Document.
- Describe spread sheets, use formulas and apply necessary formats
- Explain qualities of a robust presentation.
- Write a note on Urdu Word Processing.
- Understand types of files and their conversions to various file types

Tools and Equipment

The tools and equipment required for this competency standard are given below:

S. No.	Items
	Computer System
	Internet Connection
	Search Engines
	Internet or LAN Connectivity
	UPS
	DVD or BLU-RAY writer
	Professional Office Suite (MS Office))/ Compatible office suite as per Operating System
	Inpage Software
	Application Softwares

Critical Evidence(s) Required



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The candidate needs to produce following **Critical Evidence(s)** in order to be competent in this competency standard:

- Create, open, save and print files
- Perform necessary formatting according to provided document format.
- Designs CVs
- Create result Sheet
- Make presentation
- Convert file to different formats



061301-D Perform Internet Surfing and Email Management

Overview: After this competency standard candidate will be able perform searching on web using various search engines. The candidate shall be able to manage email accounts efficiently and use cloud services i.e., Google drive, one drive, drop box etc.

Competency Unit	Performance Criteria
CU1. Perform browsing using different browsers	P1. Browse required data. P2. Download / upload data from the internet
CU2. Create email account	P1. Create email accounts on various service providers. P2. Remove Errors while Email configuration P3. Send and receive emails

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes:

- How to use various browsers
- Describe types of search engines
- Describe management of emails on various platforms.
- How to configure email accounts on outlook Differentiate between downloading and uploading data

Tools and Equipment

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Computer System
2.	Internet Connection
3.	Web Browser
4.	Search Engines
5.	Internet or LANConnectivity



6.	Operating System (Windows, Linux)
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Critical Evidence(s) Required

The candidate needs to produce following **Critical Evidence(s)** in order to be competent in this competency standard:

- Use search engines efficiently
- Configure email account on outlook.
- Create and send emails



061301-E Perform Basic Communication Skills

Overview: This unit describes the skills and knowledge required to assist in the development of basic communication competence by providing information regarding different forms of communication and their appropriate use. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Unit	Performance Criteria
CU1. Communicate in a team	<p>P1. Treat team members with respect</p> <p>P2. Maintain positive relationships to achieve common organizational goals</p> <p>P3. Get work related information from team</p> <p>P4. Identify interrelated work activities to avoid confusion</p> <p>P5. Adopt communication skills, which are designed in a team.</p> <p>P6. Identify problems in communication with a team</p> <p>P7. Resolve Communication barrier through discussion and mutual agreement</p>
CU2. Follow Supervisor’s instructions as per organizational SOPs	<p>P1. Receive the instructions from Supervisor</p> <p>P2. Carry out the instructions of the supervisor</p> <p>P3. Report to the supervisor as per organizational SOPs</p>
CU3. Develop Generic communication skills at workplace	<p>P1. Develop basic reading skills</p> <p>P2. Develop Basic writing Skills</p> <p>P3. Develop basic listening skills</p>

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out the tasks covered in this competency standard. This includes the knowledge of:

- Reporting techniques
- Application of Work ethics
- Good communication skills (7Cs of effective communication)



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- Workplace dress code
- The role of team members and functionality of the teams
- Team dynamics
- Basic Reading Skills
- Basic Writing skills
- Basic Verbal communication skills
- Basic Problem-solving skills
- Basic Self-Management Skills
- Basic Technology Skills
- Basic Interview Skills

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Maintain effective communication with colleagues and supervisors
- Prepare different office reports



061301-F Perform Installation and Configuration of Network Cables

Overview: This competency unit covers the skills and required knowledge to install and configure computer hardware and networks. The underpinning knowledge regarding computer hardware and networks will be sufficient to provide the basis for the job at workplace.

Competency Unit	Performance Criteria
CU1. Prepare network cables	<p>P1. Select cable as per requirement (CAT5, CAT6 etc)</p> <p>P2. Calculate the length of cable as per requirement</p> <p>P3. Prepare crossover and straight network cable.</p>
CU2. Perform maintenance & troubleshooting	<p>P1. Check the cable connectors with cable tester</p> <p>P2. Check connectivity between devices (cable and switches/ routers/ hardware components) manually</p> <p>P3. Repair Cable</p> <p>P4. Replace the connectors / hardware components if required</p> <p>P5. Ping all network nodes to check the connectivity</p> <p>P6. Check the cable connectivity with each network node</p> <p>P7. Conduct test to check the data rate and bandwidth of network</p>

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes:

- Capable to determine the cable according to speed, length and performance.
- Basic knowledge about straight through and cross connection
- Knowledge and understanding of Communication Media & Connectors – Unshielded twisted-pair (UTP), shielded twisted pair (STP), Fiber Optics and coaxial cable: RJ45, RJ-11, BNC
- Understanding of color codes of CAT5 cable. 568A and 568B convention
- Knowledge about color coding of network cable
- Capable to configure the Interoperability between systems (server and work stations) and data rate as per requirement / scenario.

Tools and Equipment

The tools and equipment required for this competency standard are given below:



S. No.	Items
1	PPEs
2	Networking Cables (CAT5, CAT6, Fiber optics, Coaxial)
3	Network Switches
4	Network Connectors like RJ45
5	Cable cutters and punctures
6	Routers
7	Cable tester

Critical Evidence(s) Required

The candidate needs to produce following **Critical Evidence(s)** in order to be competent in this competency standard:



061301-G Install Configure and Trouble Shoot Switch & Router

Overview: After this competency standard candidate will be able to Access and configure basic Modes of Switch and Router.

Competency Unit	Performance Criteria
CU1. Install, and connect network switch and router	P1. . Install the network switch/ router according to layout diagram P2. Connect the switches and routers with network cables
CU2. Configure IP Addresses	P1. . Check the network connectivity P2. . Assign IP Addresses as per IP plan P3. Assign Network addresses
CU3. Configure Dynamic Routing Protocols	P1. Run the desired/instructed Dynamic Routing Protocols P2. Advertise the network & Perform Convergence P3. Perform Network Address Translation P4. Ping the destination
CU4. Perform maintenance & troubleshooting	P1. Check the network connectivity P2. Rectify duplex and speed mismatch problems P3. Diagnose common network problems P4. Identify the IP addresses assigned to your computer and your network P5. Detect the faults of normal operational behavior P6. Integrate the PC's into Local Area Network (LAN) or WAN

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes:

- Knowledge of console cable and rollover cable.
- Knowledge of connecting Switch / Router.
- Knowledge of HyperTerminal Software
- Knowledge of Basic configuration of Switch / Router
- Basic knowledge of services of server machines i.e. (File servers, Print servers, Mail servers, Communication servers, Database servers, Print servers, Web servers)



- Basic knowledge of industry-accepted operating system, hardware and wireless access points
- Network Components -Modems, Firewall, Hubs, Bridges, Routers, Gateways, Repeaters, Transceivers, Switches, Access point, etc. – their types, functions, advantages and applications
- Knowledge of Network Interface Card in which sends data, receives data, and controls data flow between the computer and the network.
- Differentiate between active and passive network
- Assigning static or dynamic IP's as per requirement.
- Knowledge in detail about network protocols (TCP / IP), OSI model, IPV4, IPV6, physical addresses (MAC Addresses) of network devices.
- Setting IP Address(IP4/IP6) & Subnet Mask, Classes of IP Addressing
- Types of topologies and networks including appropriate hardware and software installations with functionalities. – Star, Ring, Bus, Tree, Mesh, Hybrid.
- Type of Networks – Local Area Networks (LAN), Metropolitan Area Networks (MAN), Wide Area Networks (WAN) and Internet, Ethernet, Wi-Fi, Bluetooth, Mobile Networking, Wire and wireless Networking.
- Difference between Intranet and Internet.
- Data transmission basic terms (ping, **Latency,Packet Loss,throughput, bandwidth &Jitter**)
- Knowledge about International available manufacturer's Routers
- Knowledge about 3 tier architecture
- Understanding of different External ports of Router (LAN, WAN & Admin Ports (Console, AUX))
- Capable to access router.
- Understanding of different modes of router
- Have strong grip on IPv4 & IPv6 addressing Scheme & Subnetting
- Knowledge about IGP's & EGP's Routing Protocols
- Understanding of Administrative Distance (AD), Cost/Metric & best path calculation criteria of different dynamic routing protocols
- Understanding of Network Address Translation (NAT & PAT)



- Knowledge of shared printers and other resources provided to the users of the network by servers. Resources provided include data files, printers, software, or any other items used by clients on the network.
- Capable to analyze the customer requirement, resources scenario building.
- Identify the existing hardware and network problems and resolve the issues.
- Knowledge about different available manufacturer’s switches, routers and network devices.
- Capable to implement the directories, user account with policies.
- Knowledge about legal regulations and corporate policies.
- Knowledge of cost estimation of cables
- Differentiate between switches and routers

Tools and Equipment

- The tools and equipment required for this competency standard are given below:

S. No.	Items
1. 1	Personal Protective Equipment
2. 2	Laptop / Desktop
3. 3	Console Cable
4. 4	Rollover Cable
5. 5	Switch
6. 6	Router
7. 7	HyperTerminal Software
8. 8	Tools Kit
9. 3	Network cable with tester
10. 4	Network Interface Card (NIC)
11. 5	Modem

Critical Evidence(s) Required

The candidate needs to produce following **Critical Evidence(s)** in order to be competent in this competency standard:

- Access Switch / Router on PC
- Assign IP to Interface
- Set Password to Switch / Router



061301-H Install System Software on the Devices

Overview: This unit describes the skills and knowledge required to manage a range of meetings including overseeing the meeting preparation processes, chairing meetings, organizing the minutes and reporting meeting outcomes.

Competency Unit	Performance Criteria
CU1. Install and configure Utility Software & Device Drivers	P1. Select Utility & device drivers. P2. Install application software P3. Install utility programs to improve functionality P4. Perform product activation P5. Check utility software working in proper manner.
CU3. Install Firmware	P1. Check for firmware update. P2. Download the firmware P3. Update the firmware P4. Check software working in proper manner.

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes:

- Different type of Antivirus software.
- Knowledge of Scanning, Integrity Checking, Interception
- Knowledge of Online Virus Testing (Avast, AVG, Panda, Bit defender, Microsoft Security Essentials)
- Use of Antivirus, cause damage to a computer's software, hardware or data.
- Use of backup software for files on computer.
- Knowledge of backup software uses cloud storage to create backups.

Tools and Equipment

The tools and equipment required for this competency standard are given below:

S. No.	Items
1	Storage Devices
2	CD Drives
3	CDs / DVD
4	



Critical Evidence(s) Required

The candidate needs to produce following **Critical Evidence(s)** in order to be competent in this competency standard:

- Install and configure Utility Software & Device Drivers
- Install Firmware



061301-I Configure Hardware Raid (Redundant Array of Independent Disk)

Overview: This competency unit covers the skills and required knowledge to install, configure and manage RAID, disk volumes using the server's / work stations to be sufficient to provide the basis for the job at workplace.

Competency Unit	Performance Criteria
CU1. Install and configure raid	P1. Choose hardware and software RAID based controller P2. Configure required RAID Levels work for HDD (Hard disk drive) P3. Configure required RAID Levels work for Solid State Drives (SSD) media
CU2. Boot and test the system	P1. Select boot drive P2. Start Booting process P3. Check RAID's speed by (Timing, Frequency, Data rate) as guided P4. Check the performance of individual drives P5. Check the Speed affecting factor of RAID

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes:

- Knowledge about booting process of different Computer manufacturers
- Knowledge about booting method through different resources i.e CDs, USB, Network at Installation level
- Basic knowledge of deploy hardware RAID in two ways i.e an external RAID Controller Card or internal RAID-on-Chip
- Basic knowledge of RAID tools.
- knowledge of most common schemes / RAID levels (RAID 0, 1, 5, 6, and 10)
- Knowledge of hard disk testing tools (HD Tune) which work with RAID volumes.
- Factors Affecting RAID Speed

Tools and Equipment

The tools and equipment required for this competency standard are given below:

S. No.	Items
1	RAID card



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2	Hard Disk Drives / Solid State Devices
3	Software use for Virtually RAID configuration
4	Workstation Desktop / Laptop
5	Internet device

Critical Evidence(s) Required

The candidate needs to produce following **Critical Evidence(s)** in order to be competent in this competency standard:

- Install and configure Raid
- Boot and test the System



061301-J Follow Safety Rules at Site

Overview: This competency standard covers the skills and knowledge required to work according to personal health and safety protocol at crushing plant site. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Maintain occupational safety and health at workplace	P1. Identify basic safety signs and symbols P2. Erect barricades, hoardings, signage in the hazardous areas P3. Maintain housekeeping P4. Report unsafe condition to immediate supervisor (shift position)
CU2. USE Personal Protective and Safety Equipment (PPE)	P1. Identify risk associated with job to be done P2. Select PPE according to job P3. Wear PPE according to job P4. Store PPE at Designated place after use
CU3. Perform Communication Signals	P1. Identify different types of communication hand signals. P2. Use appropriate hand signals as per situation.

Knowledge& Understanding

The student must be able to demonstrate knowledge and understanding required to carry out tasks covered in this competency standards. This includes the knowledge of:

- Types of hazards
- Verbal and non-verbal (Hand Signals) communication
- Basic first aid treatment
- Safety signs and symbols
- Manual handling of loads
- Standard procedure of handling, storing and stacking material.
- Usage of Appropriate PPE for different situations

Critical Evidence(s) Required

The candidate needs to produce following critical evidence (s) to be competent in this competency standard:

- Use of PPE according to hazard/job
- Keep the workplace clean and tidy
- Balance the load while handling manually
- Use of first aid kit