

QUALIFICATION FILE : Advanced Diploma in Computer Hardware Maintenance and Networking (CHM - ALevel) course

QUALIFICATION FILE – CONTACT DETAILS OF SUBMITTING BODY

Name and address of submitting body:

NIELIT, Aurangabad, Dr. B. A. M. University Campus, Aurangabad – 431 004 (Maharashtra)

Name and contact details of individual dealing with the submission

Name: Mr. Sasidharan P T

Position in the organization Scientist / Engineer 'E'

Address if different from above NA

Tel number(s) (+91-240) 2982021, 2982022

E-mail address sasidharan@nielit.gov.in

List of documents submitted in support of the Qualifications File

1. Detailed Curriculum(Annexure I)

2. Industry Validation(Annexure II):

Recognition – Included in the courses under the project “Skill Development in ESDM Sector” under DeiTY, MCIT, Gov. of India

3. Write up on Evolution of Course Annexure III)

Summary

Qualification Title Advanced Diploma in Computer Hardware Maintenance and Networking (CHM - A Level) course

Qualification Code : NL/S/L5/C023 OR NIELIT/ES/L5/009

Nature and Purpose of qualification

The conception of a new scheme under NIELIT for hardware courses is a result of the amalgamation of experience of running the existing NIELIT Scheme in computers and pioneer industry professionals like Intel. The objective of the courses is to generate quality manpower for Hardware in the field of Information Technology (IT) by utilizing the facilities and expertise available with training institutes/ organizations in the non-formal sector.

NIELIT Hardware Course “CHM-A level” under the Scheme:

The Objective of the CHM-A level is to train the candidates, who have qualified O level, with advancements in Computer hardware, networking and troubleshooting with advancements in Computer hardware, networking and troubleshooting. Being a modular course, only those who have qualified CHM O level will be enrolled for A level. The CHM-O Level course prepares a, 10+2/ Diploma/ graduate/ other degree Qualifiers, with basic knowledge needed to enroll for CHM A level course in relevant such as computer hardware and peripherals for installation, trouble shooting and maintenance including system software management and its back up and to undertake disaster prevention, diagnosis and rectification of faults besides personality development and communication skills.

Body/Bodies which will award the certificate for the qualification

Examination Cell,

National Institute of Electronics and Information Technology,
6-CGO Complex, Electronics Niketan,
Lodhi Road, New Delhi-110003

Body which will accredit providers to offer course leading to Qualification

National Institute of Electronics and Information Technology,

6-CGO Complex, Electronics Niketan,
Lodhi Road, New Delhi-110003

Occupation(s) , to which qualification gives access:

The career opportunities are proposed considering the sector of prospective employers i.e. Service Industry (Hardware and Software) and Academia such as Installation /Service /Maintenance Engineer (PC), System Administrator, Lab Specialist, Network Engineer/ Consultant, Network/ Information Security Manager etc.

Trainee Engineer -> Service Engineer -> Technical Support Engineer Network Engineer
Network Administrator -> Network Analyst -> Chief Information Officer

Proposed level of qualification in NSQF:

Level 5

Anticipated Volume of training/ learning requires to complete the qualification

470 Hours

Entry Requirements/Recommendations:

CHM O level qualification OR Diploma/ B Sc.

(i) Candidate who is **Diploma (Electronics/Computers) or B.Sc.(Electronics/Computer)** will have to pass following additional paper of CHM O Level. Remaining papers of CHM O Level will be exempted.

1. **H3** : Advanced networks and networking peripherals.
2. **H6** : Devices and applications

(ii) Candidate who is **Diploma (other streams)/B Sc.** will have to pass following five additional paper of CHM O Level. One paper of CHM O level will be exempted.

- 1 **H1**: PC Hardware & Components
- 2 **H2**: PC Architecture
- 3 **H3**: Advanced networks and networking peripherals
- 4 **H4**: Operating System, Software & Tools
- 5 **H6**: Devices and applications

Progression from the Qualifications

In Academic:

After completion of this course, students can go for higher level Courses in same sector

Professional

Trainee Engineer -> Service Engineer -> Technical Support Engineer Network Engineer
 Network Administrator -> Network Analyst
 -> Chief Information Officer

Planned arrangement for Recognition of Prior Learning (RPL):

It will be incorporated once RPL strategy is finalized

Formal Structure of the Qualification:**6 Months Diploma in Computer Hardware Maintenance**

Sl. No.	Modules	Min: No. of Hours
		Theory/Practical
1.	Advanced PC Hardware and Networking Components	35/25
2.	Data Communication and Computer networks	40/35
3.	Network Management and Administration	40/40
4.	LinuxAdministration	45/35
5.	Entrepreneurship Development	35/10
6.	Project	60
7.	Elective	40/30
Total Theory / Lecture Hours:		235hrs
Total Practical / Tutorial Hours:		235hrs

Total Hours:	470hrs	
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Section 1

Assessment

Body/Bodies which will carry out assessment:

National Institute of Electronics and Information Technology,
6-CGO Complex, Electronics Niketan,
Lodhi Road, New Delhi-110003

Practical - Accredited Hardware Institute (AHI)

Will the assessment body be responsible for RPL assessment?

At present not included

Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, consistent and fair and show that these are in line with the requirements of the NSQF:

a) Assessment of each module/ sub module has theory and lab part assessment. Student will be well informed about the dates etc. Details of marks distribution is as follow:

The theory exam would be of 100 marks & the practical exam would be of 50 marks. To pass the course, 50% marks are required in both theory and practical component in all six subjects and project.

There shall be practical examinations for every CHM level course. The practical and their designated hours are defined in each course. After completing the course, the training institute would conduct the practical examination. The duration of each practical examination shall be of three hours including viva-voce and maximum marks in each practical examination shall be 50. Students shall be awarded marks to be uploaded by the examiner soon after the examination. Every candidate has to pass in both Theory and Practical Examinations separately, where the passing marks are half of the maximum marks.

b) Theory examinations are conducted on line through computers with multiple choice questions, to reduce mal practice and to reduce time lag.

c) Project Work: NIELIT Hardware curriculum has a project as an important component of ‘A’ level and higher level courses. The project is identified and carried out by the candidate under the guidance and support of Faculty/ Guide and management of the respective institute. It is felt that such a project provides an opportunity to the candidate to apply his/ her knowledge and skills to real life problems (including oral and written communication skills), and as such the project shall be given utmost importance & priority both by the candidates as well as by the institute faculty/management in respect of its identification, planning and implementation.

A guide for Hardware ‘A’ level should be a person with minimum two years’ experience in the field of computer hardware/networking after completion of B.E./ B.Tech in Electronics/ Computer Science/ Equivalent and educate experience in area in which the candidate has chosen the Project. The AHI concerned will render all help including nomination of guide. Candidate can submit the project only after clearing at least three papers and appearing in remaining papers in the next examination. Project should be so chosen that it would require approximately 60 man-hours & carries a total of 100 marks (80% for the project evaluation & 20% for the viva-voce). However, the candidate is expected to complete the project by devoting extra hours as well.

Sample registration details of students is attached as Annexure IV. Sample student attendance details for practical examinations are given in Annexure V. Samples of theory and practical marks are given in Annexure VI.

Pass Percentage

To qualify for a pass in a module, a candidate must have obtained at least 50% in each theory and practical examination. The marks will be translated into grades, while communicating results to the candidates. The gradation structure is as below:-

Pass percentage	Grade
Failed (<50)	F
50%-55%	D
55%-65%	C
65%-75%	B
75%-85%	A
85% and over	S

Assessment Evidences

Assessable Outcome statements	Assessment criteria	Marks Theory (on line exam)	Marks Practical	Level
Advanced PC Hardware and Networking Components: able to handle and repair laptops,	Identify various blocks in Portable Mobile Computers, Laptops, Tablets			
	Trace out mapping of Portable Mobile Computers, Tablets etc.			
	Get the configurations of various			

<p>tablets, identify the faults and troubleshoot. & should be able to establish secured wireless network for given assignment.</p>	<p>models of portable computer, laptops and notebooks from the Websites (IBM.com, hp.com, dell.com etc.)</p> <hr/> <p>Download all the drivers and Burn a CD for this system based on on query e.g, A customer has lost the driver CD of an IBM ThinkPad series Laptop.</p> <hr/> <p>Download a latest version of the BIOS and upgradation of the BIOS of the given System for an old Laptop which doesn't support a hard disk size >10 GB.</p> <hr/> <p>Select a suitable converter for a Laptop disk has to be connected to a PC IDE port.</p> <hr/> <p>Connection of a PC IDE disk to a Laptop system on a USB port.</p> <p>Ttransfer files between two Laptops using Infrared port</p> <hr/> <p>Communication between some model of a Nokia mobile phone, and a Laptop using suitable driver (download) and communicate using infrared ports on two systems</p> <hr/> <p>Install a PCMCIA WLAN card on a laptop & establish a connection with wireless access point in the vicinity.</p> <hr/> <p>Connection of two Laptops in peer configuration using Radio based wireless LAN card.</p> <hr/> <p>Installation of PCMCIA Ethernet card on an old laptop, which doesn't have an inbuilt Ethernet card.</p> <hr/> <p>Configure wireless router/ Access point for establishing secured wireless network.</p>			<p>Level 5</p>
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	Remotely access the wireless router for its configuration and disable the configuration through wireless access.			
	Total	100	50	
Data Communication and Computer networks: Various networking aspects such as data communication, multichannel communication, recent trends in networking and network services along with recent threats in and security paradigm.	Installation of Network card, altering MAC address and revealing original MAC.			Level 5
	Working with LAN connection, terminal connection and remote LAN connection			
	Use of various access point devices			
	Use & Working with various types of DNS Various types of IP's (static, dynamic, internal, public) Demonstration of threats in Bluetooth technology Working with IPv6 addressing Applying cryptography in networks IP configuration and IP masking Installing Wi-Fi network and Wi-Fi ranges and limitation Understanding firewall/IDS/IPS logs Working and troubleshooting Video teleconferencing devices Working and troubleshooting VOIP Implementation of security features in E-commerce/E-tendering etc.			
	Total	100	50	
Network Management and Administration:	Introduction to Network Management			
	Identify network components.			
	Identifications of Different in Cabling			

<p>Protocols, with how large-scale Network Management Systems operate and are configured with advanced network configuration & system administration with Linux system</p>	And Switches And Routers			Level 5
	Installation of desktop operating systems			
	Linux Server Administration with Shell Scripting			
	Working with Network Monitoring Tools.			
	Installation of peripherals and devices			
	Installation of Windows Server operating systems			
	Installation & Configure DHCP Service On Both Server and Clint End			
	Converting From FAT32 to NFTS			
	Upgrading From Lower Versions to Higher Versions Of Desktops And Servers			
	Creating enabling and monitoring Remote access on servers and desktop systems			
Creating and configure connections like modem switches, routers, internet connection sharing's				
Shell scripting network administrations using GNU/LINUX				
Creating (Manually) resource records DNS Configuration, Zone delegation				
Configuration of DHCP Server, mail &Web server				
Security Check by brute force attack				
Troubleshooting the Devices Like Physical And Software Related and Network Related, etc,				
Total	100	50		
Linux Administration: UNIX and Linux Operating systems	Boots And Shutdowns			
	Management of user Accounts, Files.			
	Install a Linux server According to given specifications			

& use of Linux commands Manage file and directory access permissions view, set and change environment variables & able to work as system administrator.	Backup and Recovery Data and Network, etc.			Level 5
	Use of Text Editor			
	Install mail server			
	Install a printer Local and Network making Print sever			
	Archival and compression Creation of users on server mage group accounts Kernel management at run time Experiments on using shell scripting Basic networking Related to LAN/MAN/WAN Use of Linux Commands like Create, delete, move and rename files and directories Combination of several simple commands in order to produce more powerful operations. Compilation of simple programs under Linux			
Total	100	50		
Entrepreneurship Development: Entrepreneurship & will understand the nature of business development in the context of existing organizations and of new business start-ups.	Identification and selection of projects by a public survey and market study.			Level 5
	Development of a project as group activity.			
	Submission of the project report along with contents and formulation and concept of project.			
	Evaluation of project using internal rate of return method and net present value method.			

	<p>Assessment of the fire safety of own home.</p> <p>Assessment of fire safety of our institute.</p> <p>Assessment of electrical safety of various electrical equipment.</p> <p>Drill of rescue of victim of electrical hazard.</p> <p>Demonstration of CPR training (a trained Compounder/nurse or doctor should impart training)</p>			
	Total	100	50	
<p>Project work: An experience to execute a task in a given time frame, with given conditions and constraints.</p>	<p>The project is identified and carried out under the guidance and support of Faculty/ Guide and management of the respective institute. The project provides an opportunity to the candidate to apply his/ her knowledge and skills to real life problems (including oral and written communication skills).</p>			Level 5
	Total		100	
<p>Elective subject: Subject contents are designed with an intention to provide wider knowledge in the chosen subject.</p>	<p>Has to learn about an emerging topics related with computers and networking to get wider knowledge in the field. The student can choose one from the two topics identified and has to learn the various theory topics and associated practical</p>			Level 5

	Total	100	50	
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SECTION 2

EVIDENCE OF LEVEL

**Title/ Name of qualification: Diploma in Computer Hardware Maintenance (CHM – O Level)
Level: 5**

Process	Professional Knowledge	Professional skill	Core skill	Responsibility	Level
Expected to have well developed skill, with clear choice of procedures in areas related with advanced PC and Hardware Networking Components, Data Communication and Computer networks, Network Management and Administration, Linux Administration and Entrepreneurship Development	Knowledge of facts, principles, processes and general concepts, acquired through studying various module topics as per the curriculum	A range of cognitive and practical skills required to accomplish tasks and solve problems related with advanced computer hardware, maintenance and networking by selecting and applying basic methods, tools, materials and information covered as per the various practical modules of the curriculum	Desired mathematical skill needed for applying the knowledge and skill learned; understanding of social, political; and some skill of collecting and organising information, communication in the areas covered under the curriculum.	Responsibility for own work and learning and some responsibility for others' works and learning.	5

SECTION 3

EVIDENCE OF NEED

What evidence is there that the qualification is needed?

**MAIT - Ernst & Young Study 2003 about the need for computer hardware professionals
Report of DOEACC Scheme on Hardware Courses**

As per the report prepared by KPMG Advisory services pvt. ltd., for NSDC on human resource and skill requirements in the electronics and IT Hardware sector (2013-17, 2017, 22), Electronics & It Hardware is one of the emerging sectors for employment growth in India. Industry currently employs over 4.3 million people across manufacturing, Sales and marketing (including Retail) and Repair & Maintenance segments. Policy initiatives on promoting manufacturing along with increasing disposable income would drive the growth for the sector. Industry is expected to witness an addition of 4.61 million during 2013-22. Repair and Maintenance segment would contribute to maximum growth of employment.

Presently this course is included in the courses under the project “Skill Development in ESDM Sector” under DeITY, MCIT, Gov. of India.

What is the estimated uptake of this qualification and what is the basis of this estimate?

Estimated about 200 candidates per annum

As per the MAIT, report, there is a severe shortage of trained Manpower in the industry, across all levels. Though the shortage seems more acute in Manufacturing and sales function, it is equally critical for research and development initiatives. The report further identifies various functions and sectors level skill gaps in the core functions of production, quality and Design and Development in Electronics sector and proposed several recommendation and implementation strategies.

Further emphasis of manpower in Electronics Skill Development Manufacturing under Prime Minister initiative of digital India program, gives more emphasis of requirement of this type of Manpower.

What steps were taken to ensure that the qualification(s) does/do not duplicate already existing or planned qualifications in the NSQF?

This is the only course, covering the syllabus mentioned, offered as part of the Hardware Scheme by NIELIT, an autonomous society under Ministry of Electronics and IT, Govt. of India through two schemes namely -1)Regular and 2) ESDM.

In this financial year (2016-17), as of now, more than 180 students are being trained under this course at different stages.

What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated?

The scheme was revised to the new scheme in 2015. The syllabus was revised and theory examinations were made online

Data used: Industry reports, study reports / projections/ outlook in the sector

In future, it is planned to revise the scheme in every 2 years including syllabus, question bank, accreditation guidelines etc.,

The following data will be used

1. Results of assessments
2. Employer feedback will be sought post-placement
3. Student feedbacks
4. Workshops and seminar for reviewing the qualifications
5. Industry Requirements
6. Consultation/ Tie-up with Industries or Expert for review of the Curriculum.

The DOEACC SCHEME HARDWARE COURSES consisting of 1) CHM O and 2) CHM A level courses were started in during 2006-07 in association with Manufacturer's Association for Information Technology (MAIT), an apex body representing IT hardware manufacturing, training, design, R&D and associated services in India.

The objective of the scheme is to generate quality manpower for computer hardware maintenance and networking by utilizing the facilities and expertise available with training institutes/ organizations in the non-formal sector. Under this scheme, Diploma in Computer Hardware Maintenance (CHM) – 'O' Level and Advance Diploma in Computer Hardware Maintenance & Networking (CHM) – 'A' Level courses are offered. Nodal Centre for the Scheme is NIELIT Centre, Aurangabad

SECTION 4

EVIDENCE OF RECOGNITION AND PROGRESSION

What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?

With the CHM qualification students can join jobs based on the opportunities and can develop experience and move further in their career.

Occupational MAP of The sector

Level 4	Assistant System Administrators, Trainee Engineer,	Network Administrator, Network	Chief Information Officer			
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	Service Engineer , Technical Support Engineer , Network Engineer	Analyst				
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