<u>**QUALIFICATION FILE for**</u>

<u>**Diploma in Computer Hardware Maintenance (CHM - O Level) course**</u>

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

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List of documents submitted in support of the Qualifications File

1. Detailed Curriculum(Annexure I)
2. Industry Validation(Annexure II):
   a) Recognition – Included in the courses under the project "Skill Development in ESDM Sector" under DeiTY, MCIT, Gov. of India
   b) Recognition –Part of SC/ST jobseekers computer training program by Director General of Employment and Training (DGE&T)
3. Write up on Evolution of Course(Annexure III)
4. Registered Students(Annexure IV)

Summary

Qualification Title Diploma in Computer Hardware Maintenance (CHM - O Level) course

Qualification Code: NL/S/L4/C020 OR   NIELIT/HW/2/7

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 Courses under the Scheme:
CHM-O Level
The Objective of the CHM-O Level course is to train 10+2, Diploma, graduate and other degree Qualifiers to acquire basic knowledge in 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

Examination Cell,
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

Troubleshooters,

Technicians(PC) , Assistant System Administrators, Lab Demonstrators.
Proposed level of qualification in NSQF: Level 4
Anticipated Volume of training/ learning requires to complete the qualification **400 Hours**
Entry Requirements/Recommendations: Minimum -10 + 2 pass or ITI (one year after 10 pass), diploma, graduation, post-graduation or doctorate. However, the candidate should make certain that he/ she has sufficient prior knowledge to undertake this course. Students from non science background must undergo a bridge course to cover the basics, in addition to the minimum requirements mentioned above.
Progression from the Qualifications In Academic: After completion of this course, students can go for CHM – A level Course Professional Troubleshooters, Technicians(PC) , Lab Demonstrators->Assistant System Administrators 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
Date of planned review of the qualification: Five years

Section 1

Assessment

Body/Bodies which will carry out assessment:

Theory - Examination Cell,
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:(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 courses.

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.

A candidate shall be entitled to appear in examination after fulfilling following conditions:
1) Registered before due date
2) Completed the said course by attending more than 75% classes.

3) Completed tutorials and internal assignments.
4) If he/she has a valid registration (each registration is valid for a period of two years).
One failed the candidate can reappear during the registration period.

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

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 (theory and practical exam marks for the topics)	Marks Theory (on line exam)	Marks Practical	Level
PC Hardware & Components: Skills to assemble, testing, troubleshoot and installation of various software including operating systems on personal computer.	Identify and handling of Internal components in the PC Cabinets like SMPS and its connection to Motherboard and various devices,			
	Identify Motherboard, CPU, Chipset, Slots, Memory modules, memory slots, Hard Disc Drives, CDROM/DVD/Blue-Ray Disc, etc.			**Level 4**
	Assembly of PC using various parts, Interconnection between devices, cable polarities and connections, SMPS installation and power connection.			
	Identify and putting various types of Add-on Cards, Motherboard slot and their application			

	Testing & troubleshooting of personal computer problems			
	Interfacing primary Memory card in the CPU.			
	Interfacing Harddisk with the motherboard. Testing & Trobleshooting of PC through various tests.			
	Iinstallation of multiple HDD and creation of single large volume out of it,			
	Installation of Operating System like Windows7, Windows8, Windows 2008, various Linux flavors like Ubantu, SUSE, RedHat, Introduction to VMware Virtualization etc.			
	Troubleshooting of various hardware problems like SMPS failure, Display not there, missing OS or re-installation of user software or system software. CDROM, DVD lens cleaning or replacement, CMOS setup,			
	Battery replacement on motherboard in case BIOS is not retaining correct values.			
	Driver software Downloading and installation, Antivirus Software installation, scanning for viruses, removing .tmp files from WINDOWS machine, etc			
	Total	**100**	**50**	
PC Architechture:	Identify Microprocessor chip and			

Able to diagnose the problem Desktop /Laptop /Mobile/ Note pad etc. and repair	functions of various pins and correspomding block diagram of microprocessor.			**Level 4**
	Identify ARM processor chip and its various Pin functions.			
	Programming on ARM processor using ARM instructions.			
	Installation of memory modules.			
	Installation of Various adapter cards and their functioning			
	Opening the PC and identification of its different blocks,			
	Assembling and disassembling PC			
	Assembly and disassembly of different Desktop /Laptop /Mobile/ Note pad etc.			
	Identification of all chips and crystals on laptop and desktop motherboard			
	Installation of DVD/USB. Installation of hard disk in master and slave mode.			
	Replacing Mobile Processor, FPC belts, DVI cables, switches, speakers, web cams, ventilation fans, Bluetooth cards, WI-FI cards, WI-FI antenna cables of laptops.			
	Total	**100**	**50**	
Advanced networks and networking	Identify various networking components cables etc			

peripherals:				Level 4
Acquire skills to establish various types of networks, troubleshooting and maintenance of n/w.	Demonstration and installation of networking components Modems, routers, switches, Hubs, Wireless Routers			
	Demonstration and installation of networking cables co-axial , twisted pair, optic fibre, crimping of cables straight cable , cross cable , RJ 45			
	Installation of Network card in system and connecting system in LAN			
	Use of basic Networking commands- like ping, IP Config, etc with various switches.			
	IP configuration and working with various protocols			
	Setup Personalized Area Network .			
	Demonstration of LAN-client/server, user creation, password protection and peer to peer network			
	wireless network setup			
	VPN and EPN setup			
	Broadband Router installation in networks			
	Working with advance network diagnosis and connectivity command			
	Software based Firewall Installation & understanding firewall logs			

	Installation and working of Audio/video intercoms,			
	Installation and working of Video teleconferencing			
	Installation and working of Security cameras (CCTV)			
	Working and understanding of FTP and remote access			
	Demonstration of Networking administration services			
	Demonstration of VOIP Demonstration of IDS/IPS			
	Total	**100**	**50**	
Operating System, Software & Tools: Installation and woring in different Operating system (windows 7,8 & Linux), Programming in various languages , use of diagnostic tools of windows, viruses and anti viruses & method of system backup and restore.	Installation of Windows 7, 8 , Linux			**Level 4**
	Use of control panel and settings			
	Adding of new hardware, and software			
	Creating and administration of User accounts			
	Installing/scheduling/Running of Anti-virus program			
	Taking the backup of directories, files & complete hard disk			
	Installation of Windows NT Server /Linux, clients and practice of using the network			
	Running of Scan disk and Disk defragmenter as part of preventive maintenance			

	Use of different commands of Windows 7, 8, 8.1, 10 in command prompt.			
	Installation of Multiple operating Systems			
	Configuring System as server.			
	Creating a backup files on CD/ DVD etc.			
	Personalizing desktop			
	Creating partition and file system in Windows/ Linux			
	Adding and removing user accounts.			
	Basic programs in various programming languages			
	System configuration of various development platforms			
	Trouble shooting Linux basics of Operating System.			
	Use of anti-viruses			
	Total	100	50	
Personality Development: Student will be capapale for performing better in their roles as leader/ manager/ well behaved/ well mannered personality in their future.	Group discussion on any of the topic on personality.			
	Discussion & views on social work.			
	Mock events/ competitions/games.			
	Extempore speech on any subject/ topic.			

	Personality building exercises, Yoga, Physical activities, - Humour			**Level 4**
	Collect some thoughts about Motivation write it down on Drawing Sheet in Bold Letters			
	Collect Information about Good Books for Motivation read carefully & collect Good Thoughts			
	Discussion with Teacher on Positive Attitude			
	Collect new & statics of e-waste from news papers			
	Deminstration and application of First aid techniques,			
	Demo and practice of CPR technique.			
	Waste management, practice of segregation, disposal methods.			
	Total	**100**	**50**	
Devices and applications: will be able to Identify existing configuration of the computer and peripherals and also to troubleshoot and repair common problems with these devices of computers & applications of devices.	Identification of Components (input/output)			
	Identification of Ports			
	Use & Functions of each devices			
	Installation of Input Devices (mouse, keyboard, scanner micro phone, webcam, Digital camera etc....)			**Level 4**
	Installation and use of display devices(CRT, LCD, LED)			

	Installation of Output Devices(printers speakers, multimedia devices			
	Installation and use of 3D printers			
	Installation and use of projectors			
	Installation and demonstration of FAX machines			
	Use, installation and maintenance of CCTV, Digital Camera, storage devices (Hard disk , DVD, CD, Memory cards) etc.			
	Total	**100**	**50**	

SECTION 2

EVIDENCE OF LEVEL

Title/ Name of qualification: Diploma in Computer Hardware Maintenance (CHM – O Level)
Level: 4

Process	Professional Knowledge	Professional skill	Core skill	Responsi bility	Le vel
Expected to work in familiar, predictable, routine, situation of PC Hardware & Components, PC Architechture, Advanced networks and networking peripherals,	Factual knowledge acquired through studying various moduletopics as per the curriculum	Recall and demonstrate practical skills learned , routine and repetitive related with computer hardware and	Language to communicate written and oral, with required clarity the professional knolwledge and skills acquired as per the curriculum. Skill to basic	Own work and learning	4

Operating System, Software & Tools, Personality Development, Devices and applications		maintenance as per the various modules of the curriculam	arithmetic and algebraic pronciples, basic understanding of social political and natural environment.	

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.

This course is also part of SC/ST jobseekers computer training program by Director General of Employment and Training (DGE&T). Presently 5th batch of this program is being conducted across India.

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

Estimated about 2000 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.

This course is also part of SC/ST jobseekers computer training program by Director General of Employment and Training (DGE&T). Presently 5th batch of this program is being conducted across India.

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 three schemes namely -1) DGE&T, 2) ESDM and 3) Regular.

In **this financial year (2016-17), as of now, more than 2000 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 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

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.

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?

Once a student with,10 + 2 pass or ITI (one year after 10 pass), diploma, graduation, post-graduation or doctorate completes CHM O Level. He/ she can either join CHM-A Level course for which the eligibility is CHM O level qualification or can directly join companies based on the job openings. 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	Troubleshooters, Technicians(PC) , Assistant System Administrators, Lab Demonstrators. Trainee Engineer, Service Engineer , Technical Support Engineer , Network Engineer	Network Administrator, Network Analyst	Chief Information Officer