सत्यमेव जयते

GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

COMPETENCY BASED CURRICULUM

Technical Diploma (Tech. Diploma)

IT, NETWORKING AND CLOUD

Skill India
कौशल भारत-कुशल भारत

Technical Diploma

IT, NETWORKING AND CLOUD

(Designed in 2017)

NSQF LEVEL – 6

Developed By

Ministry of Skill Development and Entrepreneurship
Directorate General of Training
CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE
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1. COURSE INFORMATION

In this Diploma in IT, Networking and Cloud, the trainee is trained on **Five Core modules** each of 320 hours duration in first year. Each Core module contains professional skill & professional knowledge. In addition to this, the trainee is entrusted with the project work and extracurricular activities to build up confidence. In second year there are three electives where trainee has to select any of two elective modules, each module containing 320 hours duration with total duration of 640 hours. The trainee will be trained Industry for 800 hours (as a part of on-the-job training). There will be a common subject for all Diploma courses on **Employability Skills** which will be for 160 hours in second year. The module wise course coverage is categorized as below:-

Core Module 1 (Computer Hardware Maintenance): In this module the trainee will learn

- Safety on handling hand tools
- Disassemble and assemble Personal Computer (PC)
- Troubleshoot Input and Output devices of PC,
- Using cables and connectors effectively.
- Install operating systems Windows and Linux
- Manage files effectively in Windows and Linux environment.
- Create document, spread sheets and make presentations using open office.
- Customize PC in Windows and Linux environment.
- Will manage Device manager and Task manager in Window/Linux environment
- Secure PC with antivirus, maintain Hardware components of PC.

Core Module 2 (Computer Networking) : In this module the trainee will learn

- Basic computer network technology
- Data Communications System and its components
- Types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP
- Explain the function(s) of each layer.

- Identify the different types of network devices and their functions within a network
- Understand and build the skills of sub netting and routing mechanisms.
- Understand the basic protocols of computer networks, and how they can be used to assist in network design and implementation.
- Understand Client server concepts.

Core Module 3 (Web Designing) : In this module the trainee will learn

- How to create simple web pages using HTML 5
- Create Styles of web pages using CSS
- Create own account in cloud and launch and track no. of visitors
- Host in Amazon web server
- Embedded database with different web pages using Mongo DB
- Design and develop dynamic websites with PHP
- Make websites, web servers, game frameworks, desktop and CLI (Command Language Interpreter) applications, and IDE using Python.

Core Module 4 (Web Development) : In this module the trainee will be able to

- Create an interactive website using any of the mentioned development language.
- Integrate application with database.
- Create multimedia applications by using authoring tools
- Gain familiarity with a very convenient, flexible server-side language: PHP along with front end scripting language HTML 5 and CSS.
- Get exposed to programming concepts of JAVA.
- Use of HTML and CSS for structuring and styling of the webpage.
- Enhance their build website by storing and using customer data to generate dynamic page content using PHP.

Core Module 5 (Business Data Analytics) : In this module the trainee will

- Understand business analytics.
- Develop business intelligence
- Develop graphical representation of data
- Develop cluster analysis and its applications
- Perform data partition method for model evaluation and cross validation
- Data transformation
- Demonstrate important predictive models

Elective Module 1 (Cloud Application Developer): In this module the trainee will learn to

- Describe the emerging paradigms that are leading to the adoption of cloud computing and its service model.
- Use of Cloud platform and its service.
- Application development on the cloud (using Eclipse, Node.js).
- Working with the WebSphere /Deployment environment

Elective Module 2 (Cloud Enterprise Developer): In this module the trainee will learn to

- Build a web application with the Express framework.
- Use Web Sphere Development Tools to deploy applications to a server.
- Hands-on on Cloud Integration.
- Use cloud tools to monitor, tune, and troubleshoot.

Elective Module 3 (Web Development using Java): In this module the trainee will be able to

- Understand the object-oriented approach in programming.
- Analyze and design computer programs to solve real world problems based on object-oriented principles.
- Develops the Web Pages using java and deploying the pages in Web server.
- Develops database support for WebPages for storing and retrieving of web data.

On the Job Training: In this module the trainees will be working/training in the Industry for 800 hours. They work as apprentices/Personnel.

Employability Skills: This module is common for all Diploma courses and the total period is 160 hours. In this module the trainees will improve

- English literacy such as Pronunciation, functional grammar, reading, writing, speaking and spoken English
- Learn communication skills, listening skills, motivational training, Facing interviews and behavioural skills.
- Understand concepts of Entrepreneurship, Project preparation and marketing analysis, Institutions support and Investment Procurement.
- Understand on productivity, its benefits, affecting factors, comparison with developed countries, personal finance management.
- Understand Safety, Health and Environment Education - Safety & Health, Occupational Hazards, Accident & safety, First Aid, Basic Provisions, Ecosystem, Pollution, Energy Conservation, Global warming, Ground Water, Environment.
- Understand benefits guaranteed under various acts- Factories Act, Apprenticeship Act, Employees State Insurance Act (ESI), Payment of Wages Act, Employees Provident Fund Act, The Workmen's compensation Act.
- Understand Quality Tools: Quality Consciousness, Quality Circles, Quality Management System, Housekeeping.

2. TRAINING SYSTEM

2.1 GENERAL

Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers a range of Vocational Training courses catering to the need of different sectors of economy/ Labour market. The Vocational Training Programmes are delivered under aegis of National Council of Vocational Training (NCVT). Craftsman Training Scheme (CTS) and Apprenticeship Training Scheme (ATS) are two pioneer programmes of NCVT for propagating vocational training. Recently DGT has started Technical Diplomas for different streams and primarily implemented at DGT field institutes such as ATIs, FTIs and AHI and planned to expand to State Directorates in future.

IT, Networking and Cloud course is very much essential in the current scenario due to a lot of demand in software industries where every industry is using cloud as base. The course is for two years duration. In the first year there are five core modules each module is credit base and employable. Each module is of 320 hours and is very much independent. In second year the trainee will be taking two elective modules out of three electives each of 320 hours and will be doing on the job training in Industry for 800 hours. In addition the trainees will pick up employability skills for 160 hours. After passing out the training programme, the trainee will be awarded Technical Diploma by NCVT which has worldwide recognition.

Candidates need broadly to demonstrate that they are able to:

- Read and interpret technical parameters/ documents, plan and organize work processes, identify necessary materials and tools;
- Perform task with due consideration to safety rules, accident prevention regulations and environmental protection stipulations;
- Apply professional skill, knowledge & employability skills while performing jobs.
- Document the technical parameters related to the task undertaken.

2.2 CAREER PROGRESSION PATHWAYS

- Can pursue higher technical education like BE/B. Tech, MCA
- Can start their own enterprise on cloud maintenance, computer hardware maintenance
- Can apply for jobs in Industry as system technician, cloud developer, web designer and trainers.

2.3 COURSE STRUCTURE

Table below depicts the distribution of training hours across various course elements during a period of two years : -

S No.	Module	Course Element	Notional Training Hours
1	For five Core Modules	Professional Skill (Trade Practical)	1000
		Professional Knowledge (Trade Theory)	600
2	For two Elective Module	Professional Skill (Trade Practical)	400
		Professional Knowledge (Trade Theory)	240
3	Employability Skills		160
4	On the job training		800
	Total		**3200**
5	Project Work for each Module (40 Hours x 5 Modules) ***Note : For Elective modules in second year work included in the Instructional hours.***		200
6	Revision (16 Hours x 7 Modules)		112
7	Examination (8 hours x 7 Modules (56 Hours) + Employability Skills (3 Hours) + On the Job Training (8 hours))		67
	Grand Total		**3579**

2.4 ASSESSMENT & CERTIFICATION

The trainee will be tested for his skill, knowledge and attitude during the period of course at each module and at the end of the training programme as notified by Govt of India from time to time.

a) The **Internal assessment** during the period of training will be done by **Formative assessment method** by testing for assessment criteria listed against learning outcomes. The training institute have to maintain individual *trainee portfolio* as detailed in assessment guideline. The marks of internal assessment will be as per the template (Annexure – I).

b) The final assessment will be in the form of summative assessment method. The All India Trade Test for awarding Technical Diploma will be conducted by NCVT at the end of each Module/year as per guideline of Govt of India. The pattern and marking structure is being notified by govt of India from time to time. **The learning outcome and assessment criteria will be basis for setting question papers for final assessment. The examiner during final examination will also check** individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS REGULATION

The minimum pass percent for Practical is 60% & minimum pass percent for Theory subjects 40%. For the purposes of determining the overall result, 25 percent weight is applied to the result of each module examination.

2.4.2 ASSESSMENT GUIDELINE

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be taken into account while undertaking assessment. Due consideration should be given while assessing for team work, avoidance/reduction of scrap/wastage and disposal of scarp/wastage as per procedure, behavioral attitude, sensitivity to environment and regularity in training. The sensitivity towards OSHE and self-learning attitude are to be considered while assessing competency.

Assessment will be evidence based comprising the following:

- Job carried out in labs/workshop
- Record book/ daily diary

- Answer sheet of assessment
- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment
- Project work

Evidences of internal assessments are to be preserved until forthcoming semester examination for audit and verification by examination body. The following marking pattern to be adopted while assessing:

Performance Level	Evidence
(a) Weightage in the range of 60 -75% to be allotted during assessment	
For performance in this grade, the candidate with occasional guidance and showing due regard for safety procedures and practices, has produced work which demonstrates attainment of an acceptable standard of craftsmanship.	• Demonstration of good skill in the use of hand tools, machine tools and workshop equipment • Below 70% tolerance dimension achieved while undertaking different work with those demanded by the component/job. • A fairly good level of neatness and consistency in the finish • Occasional support in completing the project/job.
(b) Weightage in the range of above 75% - 90% to be allotted during assessment	
For this grade, the candidate, with little guidance and showing due regard for safety procedures and practices, has produced work which demonstrates attainment of a reasonable standard of craftsmanship.	• Good skill levels in the use of hand tools, machine tools and workshop equipment • 70-80% tolerance dimension achieved while undertaking different work with those demanded by the component/job. • A good level of neatness and consistency in the finish • Little support in completing the project/job
(c) Weightage in the range of above 90% to be allotted during assessment	

For performance in this grade, the candidate, with minimal or no support in organization and execution and with due regard for safety procedures and practices, has produced work which demonstrates attainment of a high standard of craftsmanship.	• High skill levels in the use of hand tools, machine tools and workshop equipment • Above 80% tolerance dimension achieved while undertaking different work with those demanded by the component/job. • A high level of neatness and consistency in the finish. • Minimal or no support in completing the project.

3. JOB ROLE

Computer Hardware Maintenance

- Disassembling and assembling of PC and its I/O devices
- Troubleshooting of PC
- Connecting external devices to PC
- Installation of software and Operating system
- Working with Windows and Linux operating systems
- Customisation of PC
- Managing PC
- Service and Maintenance of Computer Hardware

Computer Networking

- Connect Peer to Peer Network, Local Area network, configure IP address
- Install and configure server-client network
- Backup and restore ADS, DHCP and user data
- Permit FAT and NTFS sharing
- Add accounts, implement User Authentication strategy
- Configure User Environment
- Install and configure DNS, DHCP, FTP, HTTP and IIS Services
- Install Linux server, create new user and group, create public and data directory
- Secure and run SWAT
- Filter ports
- Install and configure Telnet
- Configure & Implement unmanageable Network Switch
- Configure and Implement Manageable Network Switch
- Install and configure router, bridges, HUB, wire network and Wireless network
- Configure wireless Access Point
- Manage broadband
- Troubleshoot internet connectivity

- Managing Server Network security
- Monitor and trouble shoot network protocol
- Configure Local Security Policies and Domain Security Policies
- Manage TCP/IP routing
- Connect remote desktop using Telnet, Hypernet and team viewer
- Configure web browser
- Handling spam

Web Designing

- Create HTML documents is HTML editors Note Pad/Coffee cup
- Create texts, lists, tables, frames with HTML
- Create Hyperlinks images and multimedia
- Create forms and controls
- Making Web sites using HTML
- Creating interactive Style Sheets with text, fonts, borders, backgrounds, padding
- Write CSS coding for inclusion, embedded, Inline, External CSS
- Create layers, pseudo classes and media
- Create page layout and site designing with CSS
- Create own account in cloud and launch and track no. of visitors
- Hosting Amazon web server
- Manage the Database using Mongo DB
- Installation of Webserver
- Write PHP coding by using functions
- Build Web Pages with PHP, links and URLs
- Populate MYSQL database, relational database tables
- Access MY SQL, working with retrieved data, creating records with PHP
- Making websites, web servers, game frameworks, desktop and CLI (Command Language Interpreter) applications, and IDE using Python

Web Development

- Creating web page content using HTML and enabling HTTP
- Create Dynamic Web pages and form validations using HTML 5
- Creation of Style Sheets in Dynamic Web Pages
- Creation of forms, databases, Cookies, APIs, integrating with other websites, scaling issues in PHP
- Development of Java applets
- Development of online Websites using HTML 5, CSS, PHP and Java

Business Data Analytics

- Manipulate different types of data
- Online analytics processing using OLAP tools for multidimensional analytics queries
- Use OLTP for CRM and retail sales using web focus info assist or Excel
- Able to work on Data integration, data clearing, dimension, data warehousing. Data visualizing
- Cluster analysis, segregating processed data into different patterns
- Data mining through Bayesian network, Regression Analysis, Correlation Analysis, Cluster Analysis.
- Machine Learning Approach through Decision tree induction method, inductive concept learning, conceptual cluster learning
- Oriented induction, iterative database scanning, attribute focusing.

Cloud Application Developer

- Describe the emerging paradigms that are leading to the adoption of cloud computing and its service model
- Use of Cloud platform and its service
- Application development on the cloud (using Eclipse, Node.js)
- Working with the WebSphere /Deployment environment

Cloud Enterprise Developer

- Build a web application with the Express framework
- Use Web Sphere Development Tools to deploy applications to a server
- Hands-on on Cloud Integration.
- Use cloud tools to monitor, tune, and troubleshoot

Web Development using Java

- Object Oriented Programming Concepts through Java.
- Writing programs based on real time scenarios using Java.
- Configuring Java Web server environment setup for WebPages.
- Developing simple Web pages using Java Servlets.
- Web page development & deployment using server-client technology.
- Web site creation using cookies and sessions.
- Creating Back-end support for web site.
- Creation of database from JDBC application.
- Making use of JDBC drivers for creating connection with WebPages.
- Selecting, Editing, Updating, Deletion of web data in data base.
- Saving and retrieving of images in database by java programming.

Reference NCO-2015:

- 2512.0100 – Computer Programmer / Software Engineer
- 2521.0202 – Junior Data Associate
- 2513.0101 – Web Developer
- 2513.0201 – User Interface Developer
- 2523.0100 – Data Communication Analyst / Network Administrator
- 2523.0200 – Computer System Hardware Analyst / Hardware Engineer

4. GENERAL INFORMATION

Name of the Course	**Diploma in IT, Networking and Cloud**
NCO – 2015	2512.0100 – Computer Programmer / Software Engineer 2521.0202 – Junior Data Associate 2513.0101 – Web Developer 2513.0201 – User Interface Developer 2523.0100 – Data Communication Analyst / Network Administrator 2523.0200 – Computer System Hardware Analyst / Hardware Engineer
NSQF Level	Level 6
Duration of Craftsmen Training	2 Years (5 Core Modules of 320 hours each, Two Elective Modules of 320 hours each, On-the-job training of 800 hours and Employability Skills of 160 hours)
Entry Qualification	Passed NCVT in Computer Software Application (CSA)/ Computer Hardware & Network Maintenance (CHNM) Trades
Unit Strength (No. Of Student)	20
Space Norms	70 Sq. metres
Power Norms	3.45 KW (for two units in one shift)
Instructors Qualification for	
IT, Networking and Cloud	Engineering in Computer Science/ Information Technology/ MCA/ MSc. Computer Science/Information Technology from recognized university with one year experience in the relevant field. **OR** Diploma in Computer Science/Information Technology/ MCA/ MSc. Computer Science/ Information Technology from recognized university with one year experience in the relevant field.
(iv) Employability Skill	MBA OR BBA with two years experience OR Graduate in Sociology/ Social Welfare/ Economics with Two years experience OR Graduate/ Diploma with Two years experience and trained in Employability Skills from DGET institutes. AND Must have studied English/ Communication Skills and Basic Computer at 12th / Diploma level and above. OR **Existing Social Studies Instructors duly trained in Employability Skills from DGET institutes**

5. NSQF LEVEL COMPLIANCE

NSQF level for Diploma in IT, Networking and Cloud: Level 6

As per notification issued by Govt. of India dated- 27.12.2013 on National Skill Qualification Framework total 10 (Ten) Levels are defined.

Each level of the NSQF is associated with a set of descriptors made up of five outcome statements, which describe in general terms, the minimum knowledge, skills and attributes that a learner needs to acquire in order to be certified for that level.

Each level of the NSQF is described by a statement of learning outcomes in five domains, known as level descriptors. These five domains are:

a. Process
b. Professional Knowledge
c. Professional Skill
d. Core Skill
e. Responsibility

The Broad Learning outcome of **Diploma in IT, Networking and Cloud** under BBBT mostly matches with the Level descriptor at Level- 6.

The NSQF level-6 descriptor is given below:

Level	Process Required	Professional Knowledge	Professional Skill	Core Skill	Responsibility
Level 6	Demands wide range of specialized technical skill, clarity of knowledge and practice in broad range of activity involving standard non standard practices.	Factual and theoretical knowledge in broad contexts within a field of work or study.	A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study.	Reasonably good in mathematical calculation, understanding of social, political and reasonably good in data collecting organizing information and logical communication.	Responsibility for own work and learning and full responsibility for other`s works and learning.

6. LEARNING/ ASSESSABLE OUTCOME

Learning outcomes are a reflection of total competencies of a trainee and assessment will be carried out as per the assessment criteria.

4.1 GENERIC LEARNING OUTCOME

1. Recognize & comply with safe working practices, environment regulation and housekeeping.
2. Explain the concept in productivity, quality tools and labour welfare legislation and apply such in day-to-day work to improve productivity & quality.
3. Explain energy conservation, global warming, pollution and contribute in day-to-day work by optimally using available resources.
4. Explain personnel finance, entrepreneurship and manage/ organize related task in day-to-day work for personal & societal growth.
5. Plan and organize the work related to the occupation.
6. Problem solving skills and supervise team.

4.2 SPECIFIC LEARNING OUTCOME

1. Use basic PC hand tools effectively.
2. Disassemble and assemble PC.
3. Perform basic trouble shoot of PC.
4. Work with different cables, connectors and its Crimping techniques for PC.
5. Install and maintain software's for a PC.
6. Manage files effectively in Windows.
7. Work with Linux environment by using Linux commands.
8. Create document, spread sheets and make presentations using open office.
9. Customize PC in Windows and Linux environment.
10. Manage PC in Window/ Linux environment
11. Perform troubleshooting and maintenance of PC based on the faulty condition.
12. Understand basic computer network technology.
13. Understand and configure server environment and backup services.
14. Configure different protocol services.

15. Install and configure Linux server environment.
16. Install & configure the different types of network devices in a network.
17. Configure and manage network security.
18. Configure and perform remote accessing & routing.
19. Get familiarize with internet and E-Commerce sites.
20. Create simple web pages using HTML 5.
21. Create Styles of web pages using CSS.
22. Create own account in cloud and hosting.
23. Configure embedded database with different web pages using Mongo DB.
24. Design and develop dynamic websites with PHP.
25. Make websites, web servers, game frameworks, desktop and CLI applications, and IDE using Python.
26. Understand how web works.
27. Structuring the web.
28. Scripting and Styling the web (CSS).
29. Enhancing the web using PHP.
30. Java: The key language
31. Understand business analytics and develop business intelligence.
32. Analyze data using statistical and data mining techniques for business intelligence.
33. Understand case studies for predictive models.
34. Develop case studies for predictive analytical models.
35. Understand the Cloud architecture patterns, working with the WebSphere /Deployment environment.
36. Build a web application with the Express framework, Use Web Sphere Development Tools to deploy applications to a server.
37. Deploy cloud application and cloud integration.
38. Develop the real time scenarios based on OOPs concepts and Java.
39. Develop Web pages using Java.
40. Establish database support for dynamic WebPages.
41. Develop Website using Java and deploy in cloud.

7. LEARNING OUTCOME WITH ASSESSMENT CRITERIA

GENERIC LEARNIG OUTCOME

Outcomes to be assessed/NOSs to be assesed	Assessment criteria for the outcome
1. Recognize & comply with safe working practices, environment regulation and housekeeping.	1.1 Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements.
	1.2 Recognize and report all unsafe situations according to site policy.
	1.3 Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures.
	1.4 Identify, handle and store/ dispose of dangerous/unsalvageable goods and substances according to site policy and procedures following safety regulations and requirements.
	1.5 Identify and observe site policies and procedures in regard to illness or accident.
	1.6 Identify safety alarms accurately.
	1.7 Report competent of authority in the event of accident or sickness of any staff and record accident details correctly according to accident/injury procedures.
	1.8 Identify basic first aid and use them under different circumstances.
	1.9 Identify different fire extinguisher and use the same as per requirement.
	1.10 Identify environmental pollution & contribute to avoidance of same.
	1.11 Take opportunities to use energy and materials in an environmentally friendly manner.
	1.12 Avoid waste and dispose waste as per procedure.
	1.13 Recognize different components of 5S and apply the same in the working environment.
2. Explain the concept in productivity, quality tools and labour welfare legislation and apply such in day-to-day work to improve productivity &	2.1 Explain the concept of productivity and quality tools and apply during execution of job.
	2.2 Understand the basic concept of labour welfare legislation and adhere to responsibilities and remain sensitive towards such laws.

quality.	2.3 Knows benefits guaranteed under various acts.
3. Explain energy conservation, global warming, pollution and contribute in day-to-day work by optimally using available resources.	3.1 Explain the concept of energy conservation, global warming, pollution and utilize the available resources optimally & remain sensitive to avoid environment pollution.
	3.2 Dispose waste following standard procedure.
4. Explain personnel finance, entrepreneurship and manage/ organize related task in day-to-day work for personal & societal growth.	4.1 Explain personnel finance and entrepreneurship.
	4.2 Explain role of various schemes and institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non-financing support agencies to familiarize with the policies/ programmes, procedure & the available scheme.
	4.3 Prepare Project report to become an entrepreneur for submission to financial institutions.
5. Plan and organize the work related to the occupation.	5.1 Communicate effectively with others and plan project tasks.
	5.2 Assign roles and responsibilities of the co-trainees for execution of the task effectively and monitor the same.
6. Problem solving skills and supervise team.	Ability to understand a problem by breaking it down into smaller parts.
	Identify the key issues, implications and identifying solutions.
	Apply knowledge from many different areas to solving a task.
	Motivate and supervise team for achieving the required goal.

SPECIFIC LEARNING OUTCOME

MODULE 1: COMPUTER HARDWARE MAINTENANCE		
Sl. No.	**Learning Assessable Outcome**	**Assessment Criteria**
1	Use basic PC hand tools effectively	1.1 Remove screws using a screwdriver. 1.2 Cut and Skin cables using a cutting plier. 1.3 De-solder electronic components using De-soldering pump, Remove electronic components using tweezers. 1.4 Solder electronic components. 1.5 Crimp CAT 6 cables using a crimping tool.
2	Disassemble and assemble PC	2.1 Remove power cords and peripheral Cables. 2.2 Remove the cabinet and identify the components, slots, sockets, and connector of motherboards. 2.3 Remove the SMPS. 2.4 Remove Hard disk Drive, RAM, CMOS Battery, coolant fan and DVD/BD Drive. 2.5 Remove add-on cords 2.6 Remove and clean the motherboard 2.7 Mount the motherboard on the cabinet. 2.8 Connect Hard disk Drive, RAM, coolant fan, DVD/BD Drive and fix CMOS Battery. 2.9 Connect the SMPS and add-oncards. 2.10 Assemble the cabinet. And connect the peripherals. 2.11 Connect power cords and switch on the power supply and run the PC.
3	perform basic troubleshooting of PC	3.1 Check PC Power Supply. 3.2 SMPS cables and connections to the motherboard. 3.3 Check connection of I/O devices to PC. 3.4 Remove and reinsert RAM and reinsert CMOS battery. 3.5 Check HDD/DVD cables.
4	Work with different cables, connectors and its Crimping techniques for PC.	4.1 Connect SATA/IDE Cables to Hard Disk Drive. 4.2 Crimp CAT 6 cable to RJ 45 connector. 4.3 Connect peripherals (Keyboard, Mouse, USB drive, printer) to the USB port. 4.4 Connect SVGA/HDMI Cable to the system. 4.5 Connect multimedia devices to AV Port.

5	Install and maintain software for a PC.	5.1 Software Installation. 5.2 Prepare Hard disk for OS installation by making partitions. 5.3 Setup CMOS with desired parameters for hard disk and set date and time. 5.4 Install Operating System Windows and Linux in two different partitions. 5.5 Create user accounts as administrator and Guest. 5.6 Install Device Drivers. 5.7 Install/Uninstall Application software (Office, Multimedia and Antivirus).
6	Manage files effectively in Windows and Linux environment	6.1 Draft a document using NotePad for practice on Key Board. 6.2 Create, save, rename, move, copy and delete files and folders. 6.3 Transfer files and folders from/to external storage devices. 6.4 Create a zip file. 6.5 Extract the zip file. 6.6 Create an automatic backup. 6.7 Hide/unhide files/folder. 6.8 Create a password for individual files.
7	Work with a Linux environment by using Linux commands	7.1 TTY Command, named Command, Date, cal, Whoami, Man, Pwd, Whatis, Fdisk, Sudo, Ifconfig, Chmod, Umask, Adduser, Ping, Hostname, Dpkg –i. 7.2 Touch, echo, clear, ls, Dir, Mkdir, Cat, Rmdir, Rm, Cp, Mv , Find, Head, Tail, Tar, Gzip, Bzip2, Alias, Sed, wc.
8	Create a document, spreadsheets and make presentations using open office	8.1 Draw sketches using paint. 8.2 Create your resume using edit commands in document. 8.3 Create purchase order using tables and images. 8.4 Create magazine using columns page borders, header footers. 8.5 Create an invitation letter using mail merge for n invitees. 8.6 Create mark sheet using a spreadsheet with data validation. 8.7 Create a chart for the mark sheet. 8.8 Create Pay slip using functions and formulae. 8.9 Create Pivot table/chart for inventory management. 8.10 Create Presentation by inserting charts, tables and images of the organization.

9	Customize PC in Windows and Linux environment	9.1 Set the system date and time. 9.2 Change the display properties for Background, Resolution, Screensaver, Desktop icons, Gadgets 9.3 Personalise Taskbar for Hide and Lock, Pin and unpin applications. 9.4 Setting the control panel for Add/remove hardware, Install/uninstall the software, Change properties of peripheral Device, Enable system security, Language and region, Change input methods using language and region
10	Manage PC in Window/Linux environment	10.1 Create and format partitions, volumes, assigning drive letters using disk part command. 10.2 Browse and Manage event logs using the event viewer. 10.3 Schedule and maintain automated tasks at a specific time using task scheduler. 10.4 Install and update the drivers for hardware devices using device manager. 10.5 Stop/start service using SC config command. 10.6 Create file shares and set permission. 10.7 Share files to different users and manage. 10.8 Start/stop the application using task manager. 10.9 Monitor PC performance using task manager. 10.10 Close programs which are not responding using the task manager. 10.11 Install anti-virus. 10.12 Run a full system scan. 10.13 Fix browser from redirecting to other websites (browser hijack). 10.14 Blocking un-trusted network. 10.15 Block social network websites.
11	Perform troubleshooting and maintenance of PC based on the faulty condition.	11.1 Check power cable continuity. 11.2 Check SMPC DC output, check cables and connectors. 11.3 Check cabinet power on button Service CPU ON and no display. 11.4 Check DC power supply from SMPS to motherboard. 11.5 Remove sound cord if any and check for restoration of the booting process. 11.6 Check for proper insertion of RAM. 11.7 Check for dust on the motherboard. 11.8 Replace SVGA cord with a new one.

		11.9 Check for any crack on motherboard PC. 11.10 Check for overheating of any ICs on motherboard. 11.11 Replace BIOS. 11.12 Service if the system is frequently restarting Replace the RAM. 11.13 Check for any boot virus. 11.14 Check all the connections of the motherboard. 11.15 Service if the system gives continuous beep sound Check for proper insertion of RAM. 11.16 Check for dust on the motherboard. 11.17 Replace SVGA cord with a new one. 11.18 Service if System not Booting Check SATA/IDE cable and SMPS. 11.19 Check HDD partition problem. 11.20 Check CMOS battery voltage. 11.21 Check HDD parameters in CMOS setup. 11.22 Check for boot virus. 11.23 Service if OS not loading Check RAM. 11.24 Check proper installation of Driver Software in device manager. 11.25 Uninstall recently performed drivers. 11.26 Boot in safe mode. 11.27 Service if the system gets frequently hanging Check for the proper working of CPU Cooler fan. 11.28 Check for dust in the motherboard. 11.29 Run chkdisk. 11.30 Check for boot virus. 11.31 Boot in safe mode. 11.32 Reload OS. 11.33 Service if the system is very slow. 11.34 Close all opened applications. 11.35 Run msconfig and remove unwanted startup applications. 11.36 Check virus effect on OS. 11.37 Run Chkdisk. 11.38 Troubleshoot if the paper is a jam in the printer. 11.39 Check for any loose components in the feed assembly. 11.40 Check for any blockage in paper eject assembly. 11.41 Check if paper put tray is full. 11.42 Check paper pick up sensor. 11.43 Check paper pick up roller for any damage. 11.44 Check-in cartridge access cover Remove and insert the

		cartridge.

	MODULE 2: COMPUTER NETWORKING	
1	Understand basic computer network technology.	1.1 Crimp Straight Cable using Different Colour Code 1.2 Crimp Cross Cable using Different Color Codes 1.3 Crimp Rj45 connector with Straight and Cross cable 1.4 Check signal transmission using LAN TESTER 1.5 Install and configure Peer to Peer connection. 1.6 configure IP Address
2	Understand and configure server environment and backup services.	2.1 Install and configure Server-Client Network. 2.2 Install and Configure Windows Server 2.3 Configure a server as the web server 2.4 Configure Mailbox Server 2.5 Backup and Restore ADS and DHCP 2.6 Backup and Restore User Data 2.7 Permit FAT and NTFS Sharing
3	Configure different protocol services.	3.1 Add Account 3.2 Implement AGDLP Process 3.3 Implement User Authentication Strategy 3.4 Plan and Implement OU Structure 3.5 Plan and Maintain Group Policies 3.6 Configure User Environment 3.7 Install and Configure Active Directory Services. 3.8 Installation and Configuring DNS Services 3.9 Installation and Configuring DHCP Services 3.10 Install and Configure FTP Services. 3.11 Install and Configure HTTP Services 3.12 Configure IIS Services

4	Install and configure a Linux server environment.	4.1 Install Linux Server 4.2 Create a new user and group 4.3 Create public and data directory 4.4 Create a lmlhosts file 4.5 Check host file 4.6 Filter ports 4.7 Secure and run SWAT 4.8 Install and configure Telnet
5	Install & configure the different types of network devices in a network.	5.1 Configure & Implement Unmanageable Network Switch 5.2 Configure & Implement Manageable Network Switch 5.3 Install and configure router, bridges, and HUB 5.4 Configure Wireless Access Point 5.5 Install and Configure Wire Network 5.6 Install and Configure Wireless Network 5.7 Install of AD-hoc Wireless Network 5.8 Configure Gateway Service for Internet Connectivity 5.9 Configure ADSL+2 Router for ISP Internet Connectivity 5.10 Troubleshoot Internet Connectivity
6	Configure and manage network security.	6.1 Managing Server Network Security 6.2 Set up security baseline 6.3 Configure Audit Policy 6.4 Monitor and Troubleshoot Network protocol 6.5 Configure Protocol Security 6.6 Plan security for Wireless Network 6.7 Install and Configure Different Antivirus Software 6.8 Install and Configure Admin Console 6.9 Configure a Local Security Policies 6.10 Configure Domain Security Policies 6.11 Configure RRAS Policies
7	Configure and perform remote accessing & routing.	7.1 Manage TCP/IP Routing 7.2 Configure Remote Access Authentication Protocol 7.3 Connect remote Desktop using Remote Assistance 7.4 Connect Remote Desktop using Telnet 7.5 Connect Remote Desktop using HyperTerminal 7.6 Connect Remote Desktop using Team Viewer

8	Get familiarize with internet and E-Commerce sites.	8.1 Configure web browser 8.2 Search for content using popular search engines 8.3 Use favourite folder for browsing quickly 8.4 Download & Print Web pages 8.5 Create and send e-mail, Reply to an e- mail message and a Forward email message 8.6 Send document/softcopy by email 8.7 Activate spell check using the address book and Handle SPAM 8.8 Sorting and search emails. 8.9 Block emails using filter 8.10 Store download file in mail drives 8.11 Communicate using text, video chatting and social networking sites 8.12 Protect the computer against various internet threats 8.13 Browse e-commerce website 8.14 Place order for items 8.15 Add items to Shopping Carts 8.16 Do online payment through a payment gateway or another payment method 8.17 Do online Bill payment of service providers

MODULE 3: WEB DESIGNING		
1	Create simple web pages using HTML 5.	1.1 Create HTML document using mark-up Tags in HTML editor (Notepad) 1.2 Open/run the HTML file in a web browser to check the output 1.3 Modify above HTML document using heading – paragraphs 1.4 Modify above HTML document using Line Breaks 1.5 Modify above HTML document using HTML Tags 1.6 Create Text, Lists, Tables, and Frames 1.7 Create Hyperlinks, Images and Multimedia Working with Forms and controls.

2	Create Styles of web pages using CSS.	2.1 Create a CSS document by using the ID selector 2.2 Create a CSS document by using the Class selector, Universal Selector and Grouping selector 2.3 Create CSS document with fonts: Bold, Italics, oblique 2.4 Design Stylesheet document with text transformation: Uppercase, Lowercase and capitalize 2.5 Create CSS document with font size in different pixels 2.6 Create CSS document with font weight thinner, thicker, bold 2.7 Create CSS document with alignment centre, right and left 2.8 Create CSS document with background colours and font Colours. 2.9 Create CSS document with text hovering 2.10 Create CSS document with text decoration 2.11 Create CSS document with block elements and objects 2.12 Create Lists and Tables 2.13 Create Box Model by using borders, Padding, and Margin 2.14 Crate CSS document by Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector) 2.15 Creating page Layout and Site Designs.
3	Create own account in cloud and hosting.	3.1 Install Web server in Cloud 3.2 Creating own account in the cloud and launch and track no. of visitors 3.3 Hosting in Amazon Web
4	Configure the embedded database with different web pages using Mongo DB	4.1 Install of MongoDB in the system 4.2 Create data with the following Data types – String, Integer, Boolean, double, min/max keys, arrays, timestamp, object, Null, symbol, date, object ID, Binary data, Code, Regular Expression 4.3 Insert Document in database 4.4 Update document in the database 4.5 Delete document in the database 4.6 Project document in the document 4.7 Create a MongoDB query to display all the documents in the collection data (Trainees data) 4.8 Create a MongoDB query to display the fields id,

		trainee name, lab name, Certificate No., course title, course starting date, the course ending date for all the documents in the collection trainee's data. 4.9 Create a MongoDB query to display the fields id, trainee name, lab name, Certificate No., course name, course starting date, the course ending date for all the documents in the collection trainee's data, but excluding lab name 4.10 Create a MongoDB query to display all the trainees who attended a course on PHP 4.11 Create a MongoDB query to display the 1st batch trainees of PHP 4.12 Create a MongoDB query to display the 2nd batch trainees of PHP 4.13 Create a MongoDB query to find the course where maximum trainees attended. 4.14 Create a MongoDB query to find lab wise details of Trainees. 4.15 Create a MongoDB query with course wise details of Trainees. 4.16 Print the queries.
5	Design and develop dynamic websites with PHP.	5.1 Capturing Form Data Dealing with Multi-value filed Generating File uploaded form. 5.2 Redirecting a form after submission. 5.3 Write a PHP script to get the PHP version and configuration information. 5.4 Write a PHP script to display the strings. 5.5 Create a simple HTML form and accept the user name and display the name through the PHP echo statement. 5.6 Write an e PHP script to display string, values within Table. 5.7 Write a PHP script to count lines in a file. 5.8 Write a PHP function to test whether a number is greater than 30, 20 or 10 using the ternary operator. 5.9 Write a script which will display the string. 5.10 Write a PHP script which will display the colours. 5.11 Write a PHP script to sort. 5.12 Write a PHP script to calculate and display average temperature, five lowest and highest temperatures in given data. 5.13 Write a program to calculate and print the

		factorial of a number using a for a loop. 5.14 Write a PHP script using nested for loop. 5.15 Write a PHP program to generate and display the first and lines of a Floyd. 5.16 Write a function to calculate the factorial of a number 5.17 Write a function to check a number is prime or not. 5.18 Write a function to reverse a string. 5.19 Write a PHP function that checks whether a passed the string is a palindrome or not? 5.20 Write a simple PHP class which displays the given String. 5.21 Write a PHP Calculator class which will accept two values as arguments, then add them, subtract them, multiply them together or divide them on request. 5.22 Write a PHP script to - a) transform a string all uppercase letters. b) transform a string all lowercase letters. c) make a string's first character uppercase. d) Make a string's first character of all the words uppercase.
6	Make websites, web servers, game frameworks, desktop and CLI applications, and IDE using Python.	6.1 Install Python software in the system. 6.2 Print a string using the print statement. 6.3 Print given string using indentation (space between characters). 6.4 Define Integer Variables, floating variables, and string Variables. 6.5 Write a program to add numbers and strings to the correct list using the append list method. 6.6 Write a python program to add, subtract, multiply and divide gave two numbers by using arithmetic operators 6.7 Write a python program multiplying strings to form string with a repeating sequence. 6.8 Write a Python program to get the largest number from a list by using max and mini commands. 6.9 Write a Python program to find whether a given number (except the user) is even or odd by using if else command. 6.10 Write a Python program to create a histogram from a given a list of integers by using for while loop.

		6.11 Write a Python program to compute the greatest common divisor (GCD) of two positive integers by using loops. 6.12 Write a Python program to get the least common multiple (LCM) of two positive integers using if-else and while commands. 6.13 Write a Python program to sort (ascending and descending) a dictionary by value. 6.14 Write a Python program to create a tuple. 6.15 Write a Python program to create a tuple with different data types. 6.16 Write a Python program to create a set. 6.17 Write a Python program to add a member(s) in a set. 6.18 Write a Python program to find the maximum and the minimum value in a set. 6.19 Write a Python program to find the length of a set. 6.20 Write a Python program to convert temperatures to and from Centigrade to Fahrenheit. 6.21 Write a python program to find Fibonacci series. 6.22 Write a python program to find factorial using the Function. 6.23 Write a python program to find whether the given the stringis palindrome or not by using the function. 6.24 Write a python class to reverse a string word by word. 6.25 Write a python class named as a circle by a radius and two methods of computer area and perimeter of a circle. 6.26 Write a python program to sort a list of elements using the bubble sort algorithm. 6.27 Write a python program to copy the content of a file to another file. 6.28 Write a python program to find the frequency of words in a file.

MODULE 4: WEB DESIGNING		
1	Understand how the web works	1.1 Create web page content using HTML (Hyper Text Markup Language) Tags. 1.2 Enable Hypertext Transfer Protocol (HTTP) via getting and POST requests. 1.3 Obtain input from users.
2	Structuring the web	2.1 Divide a webpage into logical sections. 2.2 Set up a proper structure of headings and Paragraphs. 2.3 Display computer code with HTML. 2.4 Annotation of images and graphics. 2.5 Marking abbreviations. 2.6 Add quotations and citations to web pages. 2.7 Embed a webpage within another webpage. 2.8 Add Flash content within a webpage. 2.9 Create a data spreadsheet. 2.10 Create HTML tables. 2.11 Optimize HTML table rendering. 2.12 Create collapsible content with HTML. 2.13 Add context menus to a webpage. 2.14 Create of a dialogue box with HTML. 2.15 Add multiple languages into a single Webpage. 2.16 Controlling of HTML line breaking. 2.17 Mark changes (added and removed text). 2.18 Add responsive image to a webpage. 2.19 Add vector image to a webpage. 2.20 Add a hit map on top.
3	Scripting and Styling the web (CSS)	3.1 Apply CSS within a webpage. 3.2 Apply CSS to HTML. 3.3 Select elements via element name, class or ID. 3.4 Select elements via attribute name and Content. 3.5 Apply pseudo-elements. 3.6 Specify colours in CSS. 3.7 Debug CSS in the browser. 3.8 Style text and customize a list of elements. 3.9 Add shadows to text. 3.10 Size CSS boxes. 3.11 Control overflowing content. 3.12 Control the part of a CSS box to draw the Background. 3.13 Create fancy boxes (also see the Styling boxes module, generally). 3.14 Use background-clip to control the background image

		covers. 3.15 Change the box model completely using box-sizing. 3.16 Control backgrounds. 3.17 Apply control borders. 3.18 Style an HTML table. 3.19 Add shadows to boxes. 3.20 Calculate specificity of a CSS selector. 3.21 Control inheritance in CSS. 3.22 Apply filters in CSS. 3.23 Apply blend modes in CSS. 3.23 Apply CSS multi-column layouts. 3.24 Apply CSS generated content.
4	Enhancing the web using PHP.	4.1 Create a form in PHP and apply validations. 4.2 Create a date and time from a number of parameters in mktime 4.3 Create a date and time from the Strtotime () function. 4.4 Create more dates/times from strtotime (). 4.5 Output the dates for the next six Saturdays. 4.6 Output the number of days until 10th of July. 4.7 Create and retrieve a cookie. 4.8 Modify a cookie value. 4.9 Delete a cookie. 4.10 Check if cookies are enabled. 4.11 Select data with MySQLi (Object-oriented). 4.12 Select data with MySQLi (Object-oriented) and put the result in an HTML table. 4.13 Select data with MySQLi (Procedural). 4.14 Select data with PDO (+ Prepared statements).
5	Java: The key language	5.1 Write a Java Programme to print Hello on Screen. 5.2 Write a Java Program to find arithmetic Operations. 5.3 Write a Java Program to find the biggest no. in given three nos. 5.4 Write a java program to print Fibonacci Series without using recursion and using Recursion. 5.5 Java Program to Solve any Linear Equation One Variable. 5.6 Java Program to Find Inverse of a Matrix. 5.7 Java Program to Perform Encoding of aMessage Using Matrix Multiplication. 5.8 Write a Java program to sort a numeric array and a string array. 5.9 Write a Java program to remove a specific an element from

		an array. 5.10 Write a Java program to get the minimum value of the year, month, week, date from the current date of a default calendar. 5.11 Perform animation in the applet. 5.12 Write a java program to paint like paint brush in the applet. 5.13 Program to display analog clock in the Applet. 5.14 Program to communicate two applets. 5.15 Write a Java program to convert a hash set to a tree set. 5.16 Create runnable jar file in java? 5.17 Display image on a button in the swing. 5.18 Program to change the component colour by choosing a colour from Colour Chooser. 5.19 Program to create a notepad in swing? 5.20 Program to inherit Frame class. 5.21 Program to perform two tasks by two Threads.

MODULE 5: BUSINESS DATA ANALYTICS		
1	Understand business analytics and develop business intelligence.	1.1 Use Excel for understanding different types of data (Integer, double, text, date). 1.2 Perform operations on different data types. 1.3 Segregate data in different sheets. 1.4 Calculate the arithmetic mean, geometric mean and Harmonic mean. 1.5 Calculate median from raw & grouped data. 1.6 Calculate mode for row & grouped data. 1.7 Calculate the standard deviation for a set of data 1.8 Calculate standard variance for a set of data. 1.9 Online analytics processing using (OLAP) tools. 1.10 Use OLTP for CRM and retail sales using web focus infoassists or Excel.
2	Analyse data using statistical and data mining techniques for business intelligence.	2.1 Segregate structured data &unstructured data. 2.2 Exercises on data integration. 2.3 Exercises on data clearing. 2.4 Create a data dimension. 2.5 Exercises on data warehousing. 2.6 Exercises on data visualization. 2.7 BI case studies to improve customer experiencein roles & responsibilities. 2.8 Case studies on self-service & collaborative BI. 2.9 Exercises on BI strategies. 2.10 Exercises on the BI project.

3	Understand case studies for predictive models.	3.1 Exercises on data representation & cluster Analysis. 3.2 Case studies on different patterns of data. 3.3 Case studies on pre-processing the data. 3.4 Case studies on transforming the preprocessed data. 3.5 Case studies on segregating pre-processed data into different patterns. 3.6 Case studies on Evaluating the data patterns. 3.7 Case studies on Tread Analysis. 3.8 Case studies on statistical approach for data mining through. 3.9 Bayesian network. 3.10 Regression Analysis. 3.11 Correlation Analysis. 3.12 Cluster Analysis. 3.13 Case studies on CRISP – DM model. 3.14 Case studies on data partitioning.
4	Develop case studies for predictive analytical models.	4.1 Exercise for machine learning approach: 4.1.1 Case studies on Decision tree induction Method. 4.1.2 Studies on inductive concept learning. 4.1.3 Case studies on conceptual cluster learning. 4.2 Exercise on database oriented approach: 4.2.1 Case studies on attribute-oriented induction 4.2.2 Case studies on iterative database scanning. 4.2.3 Case studies on attribute focusing. 4.3 Exercise on other approaches 4.3.1 Case studies on neural networks. 4.3.2 Case studies on Rough Sets. 4.3.3 Case studies on Visualisation. 4.4 Case studies on odds and odds ratio.

	Elective 1: Cloud Application Developer	
1	Understand the Cloud architecture patterns, Working with the WebSphere /Deployment environment.	1.1 Overview of cloud platform dashboards. (IBM Blue mix) 1.2 Operations like creation, launch, security, and cleaning of instances will be performed. 1.3 Bluemix and the Cloud Foundry command line interface (CLI) 1.4 Develop Bluemix applications with Eclipse 1.5 Develop Bluemix applications with IBM Bluemix DevOps services 1.6 Bluemix with Cloud ant

		1.7 Build a mobile data Bluemix application 1.8 Extend the Bluemix mobile data application to access it from a mobile web application.Skills on Developing Cloud Applications with IBM SDK for Node.js 1.9 Set up your Node.js development environment in IBM BlueMix 1.10 Asynchronous I/O with call-back 1.11 Node packages.
2	Develop Cloud applications.	2.1. Simple Chat application 2.2. Hello World 2.3. Deploy the created application into Liberty profile

	Elective 2: Cloud Enterprise Developer	
1	BUILD a web application with the Express framework, Use Web Sphere Development Tools to deploy applications to a server.	1.1 Setting up the environment 1.2 Deploying Tomcat application to Bluemix 1.3 Installing and running the migration analysis tools 1.4 Creating a database service in Bluemix 1.5 Deploying the application in Bluemix 1.6 Testing the application 1.7 Deleting the application 1.8 Installing a local Tomcat server into Eclipse 1.9 Importing and running the application in Eclipse 1.10 Running the cloud migration analysis tools 1.11 Analysing the results 1.12 Creating database service in Bluemix 1.13 Deploying the application in the cloud 1.14 Testing your application (optional) 1.15 Deleting the application 1.16 Running the document manager application on-premises 1.17 Setting up the migration environment 1.18 Migrating the server configuration by using the configuration migration tool. 1.19 Importing and analysing the application 1.20 Migrating the application Deploying the application to Bluemix 1.21 Setting up security functionalities 1.22 Setting up of alarmsSkills on Integration of Bluemix

		Applications with On-premises Resources On-premises Resources 1.23 Building an IBM Container that represents a back-end system 1.24 Testing the application 1.25 Setting up the Eclipse development environment 1.26 Setting up IBM Secure Gateway 1.27 Defining JDBC access through IBM Secure Gateway 1.28 Enabling REST, Web Services, and JMS access through IBM Secure Gateway 1.29 Establishing Client TLS 1.30 Establishing Application TLS 1.31 API Management 1.32 Connect & Compose 1.33 DataWorks 1.34 User-defined services 1.35 Cleaning up your resources
2.	Deploy cloud application and cloud integration.	2.1 Security functionalities on different cloud platforms. Develop a security and integration framework of the application /project deployed on Bluemix platform.

	Elective 3: Web Development using Java	
1	Develop real-time scenarios based on OOPs concepts and Java	1.1 Write a program to demonstrate encapsulation & Write a Java program to print 'Hello' on screen and then print your name on a separate line. 1.2 Write a program in Java to display the pattern like right angle triangle with a number. 1.3 Write a program to demonstrate static and dynamic polymorphism. 1.4 Write a program to demonstrate method overloading and overriding 1.5 Write a program to create a constructor for a class. 1.6 Write a Java program to sort ascending / Descending of given array 1.7 Write a Java program to add two matrices 1.8 Write a Java program to test the equality of two arrays 1.9 Write a Java Programme to find that the given string is Palindrome? 1.10 Write a program to create wrapper classes. 1.11 Write a program to demonstrate a single level, multiple level inheritance. 1.12 Write a program to demonstrate super keyword 1.13 Write programs to demonstrate the interfaces in Java

		1.14 Write programs to demonstrate the abstract class in java 1.15 Write a program to create and use a package in java 1.16 Write a program to demonstrate inner classes in java 1.17 Write programs to demonstrate try-catch blocks in java 1.18 Write a program to demonstrate throws keyword in java 1.19 Write a program to demonstrate finally keyword in java 1.20 Write a program to Create user defined exceptions in java 1.21 Write a program to demonstrate multi-threading in java 1.22 Write a program to create a login page using Java AWT 1.23 Write a program to create different grid layouts using Java AWT 1.24 Write a program to create a job Registration form using Java AWT 1.25 Write a program to handle the events for —Sign UP‖ and —Login‖ button clicks 1.26 Write a program to handle the events in the registration form
2	Develop Web pages using Java.	2.1 Write simple Servlet Hello World, compile and deploy it 2.2 Write simple Servlet program to pass and read values to Hello from using the GET method 2.3 Write simple Servlet program to pass and read values to Hello from using POST method 2.4 Write a simple Servlet program to read values from checkbox. 2.5 Write a servlet program to read HTTP header information 2.6 Write a servlet to send 407 error code to the client browser and to display the message as —Need Authentication 2.7 Write Servlet program to print client IP, Date & Time using servlet filters 2.8 Write a program to perform basic exception handling in servlets 2.9 Write a servlet program to set cookies to the First name, Second Name, Mobile No, Email ID fields in a form 2.10 Write a servlet program to read cookies names and values

		2.11 Write a Servlet program to display the session information of webpage 2.12 Write a servlet program to access employees table from database 2.13 Write a servlet program to edit, update and delete employee's information in the database 2.14 Write a servlet program to display current data & time on webpage 2.15 Write a servlet program for an auto page refresh.
3.	Establish database support for dynamic WebPages.	3.1 Create a connection to the database (MSAccess/MySQL/Oracle) using JDBC 3.2 Create a database using JDBC 3.3 Select database using JDBC application 3.4 Drop existing database using JDBC application 3.5 Create statement and result set 3.6 Create a table using JDBC application. 3.7 Delete the table using JDBC application 3.8 Insert the records using JDBC application 3.9 Select the records using JDBC application 3.10 Edit & Update the records using JDBC application 3.11 Delete the record using JDBC application 3.12 Conditionally Select the records from a table by WHERE clause using JDBC application 3.13 Conditionally select the records from a table by LIKE clause using JDBC application 3.14 Sort the records using JDBC application 3.15 Store the image in database using JDBC application 3.16 Retrieve the image from database using JDBC application.

4	Develop Website using Java and deploy in the cloud	Create a simple organization website with employee registration and login.

8. SYLLABUS

Syllabus for Diploma in "IT, Networking and Cloud"			
Core Module 1 : Computer Hardware Maintenance : 320 Hrs			
Hour No.	**Learning outcome**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
		(with indicative Hours)	
1-8	Use basic PC hand tools effectively.	**Skills on using Basic PC Hand Tools (5 hrs)** • Remove screws using screw driver (1 Hr) • Cut and Skin cables using cutting plier (1 Hr) • Desolder electronic components using desoldering pump, Remove electronic components using tweezers • (1 Hr) • Solder electronic components (1 Hr) • Crimp CAT 6 cables using crimping tool (1 Hr)	**Hand Tools (3 Hrs)** • Specifications of Tweezers, Screw Driver, Cutting Pliers, Crimping Tool, Soldering Iron, Desoldering Pump • Safety hazards on basic hand tools
9-24	Disassemble and assemble PC	**Disassembling PC (5 Hrs)** • Remove power cords and peripheral cables (1 Hr) • Remove the cabinet and identify the components, slots, sockets, and connectors of motherboards. (1 Hr) • Remove the SMPS (1 Hr) • Remove Hard disk Drive, RAM, CMOS Battery, coolant fan and DVD/BD Drive (1 Hr) • Remove add on cords Remove and clean the motherboard (1 Hr) **Assembling PC (5 Hrs)** • Mount the mother board on cabinet (1 Hr) • Connect Hard disk Drive, RAM, coolant fan, DVD/BD	**Disassembling and Assembling PC (6 Hrs)** • Introduction to computers, applications. Basic blocks of a digital computer. • Different types and specifications of the cables and connectors used for interconnecting the devices, boards, cards, components inside a PC • Importance of SMPS, Hard disk, Internal and external memory devices • Different types of I/O Devices (Monitors, Printers, Mouse, Keyboards, Scanners, Plotters, Speakers) Precautions to be taken while

		Drive and fix CMOS Battery (1 Hr) • Connect the SMPS and add on cords (1 Hr) • Assemble the cabinet. And connect the peripherals (1 Hr) • Connect power cords and switch on power supply and run the PC (1 Hr)	opening and closing PC cabinet.
25-32	Perform basic trouble shoot of PC .	**Basic Trouble Shooting PC (5 Hrs)** • Check PC Power Supply (1 Hr) • SMPS cables and connections to the mother board (1 Hr) • Check connection of I/O devices to PC (1 Hr) • Remove and reinsert RAM and reinsert CMOS battery (1 Hr) • Check HDD/DVD cables (1 Hr)	**Basic Trouble Shooting PC (3 Hrs)** Proper troubleshooting Techniques for motherboards, I/O Devices
33-40	Work with different cables, connectors and its Crimping techniques for PC.	**Cables and Connectors (5 Hrs)** • Connect SATA/IDE Cables to Hard Disk Drive (1 Hr) • Crimp CAT 6 cable to RJ 45 connector (1 Hr) • Connect peripherals (Keyboard, Mouse, USB drive, printer) to USB port (1 Hr) • Connect SVGA/HDMI Cable to the system (1 Hr) • Connect multimedia devices to AV Port (1 Hr)	**Cables and Connectors (3 Hrs)** • Importance of Cables SATA/IDE Cables, CAT 6 cables, SVGA/HDMI cables • Importance of RF connectors, USB ports, AV Ports
41-56	Install and maintain software's for a PC.	**Software Installation (10 Hrs)** • Prepare Hard disk for OS installation by making partitions (2 Hrs) • Setup CMOS with desired parameters for hard disk and set date and time (1 Hr) • Install Operating System Windows and Linux in two different partitions (3 Hrs) • Create user accounts as	**Software Installation (6 Hrs)** • Distinguish between System Software and Application Software • Differentiate between Linux and Windows OS • Windows 32 bit, and 64 bit System • FDISK, Format, Scandisk, FAT System, NTFS and Directories, Fragmentation

		administrator and guest (2 Hrs) • Install Device Drivers (1 Hr) • Install/Uninstall Application software (Office, Multimedia and Antivirus) (1 Hr)	and defragmentation disk
57-80	Manage files effectively in Windows	**File Management (15 Hrs)** • Draw sketches using paint for practice on mouse/touch pad (2 Hrs) • Draft a document using Note Pad for practice on Key Board (3 Hrs) • Create, save, rename, move, copy and delete files and folders.(2 Hrs) • Transfer files and folders from/to external storage devices (1 Hr) • Create zip file (1 Hr) • Extract the zip file (1 Hr) • Create automatic backup (2 Hrs) • Hide/unhide files/folders (1 Hr) • Create password for individual files (2 Hrs)	**File Management (9 Hrs)** • Functions of Key board and Mouse • Applications MS Paint/Note pad • Different text formats • Different image file formats • Advantages of compressing files • Distinguish between backup and cloning
81-104	Work with Linux environment by using Linux commands.	**Linux (15 hrs)** Read terminal ID using TTY command to know which terminal we are working (1 Hrs) Execute the following Linux Commands • TTY Command, uname Command, Date, cal, Whoami, Man, Pwd, Whatis, Fdisk, Sudo, Ifconfig, Chmod, Umask, Adduser, Ping, Hostname, Dpkg –i (7 Hrs) • Touch, echo, clear, ls, Dir, Mkdir, Cat, Rmdir, Rm, Cp, Mv, Find, Head, Tail, Tar, Gzip, Bzip2, Alias, Sed, wc, sort. (7 Hrs)	**Linux (9 hrs)** • Introduction to Linux operating system • Familiarization with GUI environment • Syntax of shell commands

105-160	Create document, spread sheets and make presentations using open office	**Open Office (35 Hrs)** • Draw sketches using paint (2 Hrs) • Create your resume using edit commands in document (3 Hrs) • Create purchase order using tables and images (5 Hrs) • Create magazine using columns page borders, header footers (2 Hrs) • Create an invitation letter using mail merge for n invitees (3 Hrs) • Create mark sheet using spread sheet with data validation (3 Hrs) • Create chart for mark sheet (2 Hrs) • Create Pay slip using functions and formulae (5 Hrs) • Create Pivot table/chart for inventory management (5 Hrs) • Create Presentation by inserting charts, tables and images about organization (5 Hrs)	**Open Office (21 Hrs)** Familiarisation of open office tools for creating documents, spread sheet and presentation
161-200	Customize PC in Windows and Linux environment	**PC customization (Windows/Linux) (25 Hrs)** • Set the system date and time (2 Hrs) • Change the display properties for - Back ground - Resolution - Screen saver - Desktop icons - Gadgets (8 Hrs) • Personalise Taskbar for - Hide and Lock - Pin and unpin applications (5 Hrs) • Setting the control panel for - Add/remove hardware	**PC customization (Windows/Linux) (15 Hrs)** • Concept of GUI, Modes of starting on different occasions. • Desktop, Icon, selecting, choosing, drag and drop. My computer • Recycle bin, task bar, start menu, tool bar, and menus. • Windows Explorer. Properties of files and folders. • Applications under windows/linux accessories. • Windows/Linux Help.

		- Install/uninstall software - Change properties of peripheral devices - Enable system security - Language and region - Change input methods using language and region (10 Hrs)	• Finding files, folders, computers. • Control panel. Installed devices and properties.
201-240	Manage PC in Window/Linux environment	**PC Management (25 Hrs)** • Create and format partitions, volumes, assigning drive letters using disk part command (3 Hrs) • Browse and Manage event logs using event viewer (2 Hrs) • Schedule and maintain automated tasks at specific time using task scheduler (1 Hr) • Install and update the drivers for hardware devices using device manager (3 Hrs) • Stop/start service using SC config command (1 Hr) • Create file shares and set permission (1 Hr) • Share files to different users and manage (1 Hr) • Start/stop application using task manager (1 Hr) • Monitor PC performance using task manager (1 Hr) • Close programs which are not responding using task manager (1 Hr) Anti Virus • Install anti virus (2 Hrs) • Run a full system scan (2 Hrs) • Fix browser from redirecting to other websites (browser hijack) (2 Hrs) • Blocking un-trusted network (2 Hrs)	**PC Management (15 hrs)** Familiarisation with • Disk management • Task scheduler • Even viewer • Device manager • Shared folders • Services and applications Virus Different types of virus an anti virus Using different types of firewalls - pocket firewalls, State-full firewalls, Application layer firewalls and Proxy firewalls

		• Block social network websites (2 Hrs)	
241-320	Perform troubleshooting and maintenance of PC based on the faulty condition.	**Hardware Maintenance (50 hrs)** Service of Dead PC (5 Hrs) • Check power cable continuity • Check SMPC DC output, check cables and connectors • Check cabinet power on button Service CPU ON and no display (5 Hrs) • Check DC power supply from SMPS to mother board • Remove sound cord if any and check for restoration of booting process • Check for proper insertion of RAM • Check for dust on mother board • Replace SVGA cord with new one • Check for any crack on mother board PC • Check for overheating of any ICs on mother board • Replace BIOS Service if system is frequently restarting (5 Hrs) • Replace the RAM • Check for any boot virus • Check all the connections of mother board Service if system gives continuous beep sound (5 Hrs) • Check for proper insertion of RAM • Check for dust on mother board • Replace SVGA cord with new	**Hardware Maintenance (30 Hrs)** • Explain and apply common prevention methods • Explain Service Flow Sequence (SFS) and Trouble Shooting Chart (TSC) of PC • Safety precautions in handling PC, sub assemblies and components, Important points to be considered while purchasing and replacing components. Concept of Preventive and corrective maintenance. Tools required, Active & Passive Maintenance, Maintenance scheduling. Need of diagnostics program. Features, limitations. Examples of commonly used diagnostic programs. • Types of monitor, Monochrome and colour, CGA, EGA, VGA, SVGA, Digital Analogue, interlaced non interlaced. Specifications and comparison • Main components and connectors on display cards, display controller IC, RAM chips and dual port feature principle of working and use of display memory. • LCD and TFT Monitors. • Understanding the difference between flat screens and CRT display systems • Understanding the displays

		one Service if System not Booting (10 Hrs) • Check SATA/IDE cable and SMPS • Check HDD partition problem • Check CMOS battery voltage • Check HDD parameters in CMOS setup • Check for boot virus Service if OS not loading (5 Hrs) • Check RAM • Check proper installation of Driver Software in device manager • Uninstall recently performed drivers • Boot in safe mode Service if system gets frequently hanging (5 Hrs) • Check for proper working of CPU cooler fan • Check for dust in mother board • Run chkdisk • Check for boot virus • Boot in safe mode • Reload OS Service if system is very slow (5 Hrs) • Close all opened applications • Run MSconfig and remove unwanted startup applications • Check virus affect on OS • Run Chkdisk Troubleshoot if paper is jam in printer (5 Hrs) • Check for any loose	memory and its effect on quality and performance

		components in feed assembly • Check for any blockage in paper eject assembly • Check if paper put tray is full • Check paper pick up sensor • Check paper pick up roller for any damage • Check in cartridge access cover • Remove and insert cartridge	
	Project work/ Industrial Visit		
	Revision		
	Examination		

Syllabus for Diploma in "IT, Networking and Cloud"			
Core Module 2 :Computer Networking : 320 Hrs			
Hour No.	**Learning outcome Reference**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
		(with indicative Hours)	
321-360	Understand basic computer network technology.	**Crimp and connect Cable(25 hrs)** • Crimp Straight Cable using Different Color Codes (5 Hrs) • Crimp Cross Cable using Different Color Codes (5 Hrs) • Crimp Rj45 connector with Straight and Cross cable (3 Hrs) • Check signal transmission using LAN TESTER (2 Hrs) • Install and configure Peer to Peer connection. (5 Hrs) • configure IP Address (5 Hrs)	**Overview of Networking (15 hrs)** Introduction to networks, LAN, VLAN, CAN, MAN, WAN, Internet and Intranet etc. Uses and benefits of Network, Server-client based network, peer to peer networks. Network Interface Card, Crimping tools and Color standards for Straight crimping and Cross crimping
361-400	Understand and configure server environment and backup services.	**Server Configuration & Backup(25 hrs)** • Install and configure Server-Client Network (5 Hrs) • Install and Configure Windows Server (5 Hrs) • Configure a server as web server (5 Hrs) • Configure Mailbox Server (2 Hrs) • Backup and Restore ADS and DHCP (3 Hrs) • Backup and Restore User Data (2 Hrs) • Permit FAT and NTFS Sharing (3 Hrs)	**Transmission Media and Topologies Media types**:**(15hrs)** Concept of Server, client, node, segment, backbone, host etc. Analog and Digital transmission STP cable, UTP cable, Coaxial cable, Fiber cable, Base band and Broadband transmission, Cables and Connectors, Physical and logical topologies, Bus, Star, Ring and Mesh topologies. Concept of Asynchronous & Synchronous Transmission
401-440	Configure different protocol services.	**Plan and Implement User and Group Strategies (25 hrs)** • Add Account (1 Hr) • Implement AGDLP Process (2 Hrs.) • Implement User	**Implement User and Group Strategies(15 hrs)** • User Authentication Strategy • OU Structure • User Environment • Group Policies

		Authentication Strategy (2 Hrs) • Plan and Implement OU Structure (1 Hr) • Plan and Maintain Group Policies (2 Hrs) • Configure User Environment (2 Hrs) **Protocols and Services** • Install and Configure Active Directory Services (2 Hrs) • Installation and Configuring DNS Services (3 Hrs) • Installation and Configuring DHCP Services (2 Hrs) • Install and Configure FTP Services. (3 Hrs) • Install and Configure HTTP Services (2 Hrs) • Configure IIS Services (3 Hrs)	• AGDLP Process **Protocols and Services** • TCP/IP,HTTP, FTP,SMTP and other Different types of protocols • OSI Model • Media Access Method • DNS services • DHCP services • WINS services • RAS services • Web services • Proxy Services.
441-480	Install and configure Linux server environment.	**Linux Server installation and configuration(25 hrs)** • Install Linux Server (3 Hrs) • Create new user and group (2 Hrs) • Create public and data directory (2 Hrs) • Create an lmlhosts file (3 Hrs.) • Check host file (2 Hrs) • Filter ports (3 Hrs) • Secure and run SWAT (5 Hrs) • Install and configure Telnet (5 Hrs)	**Linux Server installation and configuration (15 hrs)** • Configuration Plan • Public and data directory • Host file • SWAT • Password
481-520	Install & configure the different types of network devices in a network.	**Network Devices(25 hrs)** • Configure & Implement Unmanageable Network Switch (3 Hrs) • Configure & Implement Manageable Network Switch (2 Hrs) • Install and configure router, bridges and HUB (3 Hrs) • Configure Wireless Access	**Network Devices(15 hrs)** • Functions of NIC • Repeaters • Hub • Switches • Routers • Bridges. • Internet service provider

		Point (2 Hrs) • Install and Configure Wire Network (2 Hrs) • Install and Configure Wireless Network (2 Hrs) • Install of AD-hoc Wireless Network (1 Hr) Manage Broad Band • Configure Gateway Service for Internet Connectivity (3 Hrs) • Configure ADSL+2 Router for ISP Internet Connectivity (2 Hrs) • Troubleshoot Internet Connectivity (5 Hrs)	
521-560	Configure and manage network security.	**Network Security(25 hrs)** • Managing Server Network Security (3 Hrs) • Set up security base line (2 Hrs) • Configure Audit Policy (2 Hrs) • Monitor and Troubleshoot Network protocol (3 Hrs) • Configure Protocol Security (2 Hrs) • Plan security for Wireless Network (1 Hr) • Install and Configure Different Antivirus Software (2 Hrs) • Install and Configure Admin Console (3 Hrs) • Configure a Local Security Policies (2 Hrs) • Configure Domain Security Policies (3 Hrs) • Configure RRAS Policies (2 Hrs)	**Network Security(15 hrs)** • Modern Network Security Threats and the basics of securing a network. • Secure Administrative Access • LAN security considerations. • Network Security Devices.
561-600	Configure and perform remote accessing & routing.	**Remote Access(25 hrs)** • Manage TCP/IP Routing (5 Hrs) • Configure Remote Access Authentication Protocol (5	**Remote Access (15 hrs)** • Overview of Remote Access • VPN Concepts. • Remote Access Authentication Protocol

		Hrs) • Connect remote Desktop using Remote Assistance (5 Hrs) • Connect Remote Desktop using Telnet (3 Hrs) • Connect Remote Desktop using HyperTerminal (2 Hrs) • Connect Remote Desktop using Team Viewer (5 Hrs)	• TCP/IP Routing
600-640	Get familiarize with internet and E-Commerce sites.	**Internet and Web Browser(25 hrs)** • Configure web browser (2 Hrs) • Search for content using popular search engines (1 Hr) • Use favourite folder for browsing quickly (1 Hr) • Download & Print Web pages (1 Hr) • Create and send e-mail, Reply to an e-mail message and Forward email message (3 Hrs) • Send document/softcopy by email (1 Hr) • Activate spell check using address book and Handle SPAM (1 Hr) • Sorting and search emails. (2 Hrs) • Block emails using filter (1 Hr) • Store download file in mail drives (2 Hrs) • Communicate using text, video chatting and social networking sites (2 Hrs) • Protect the computer against various internet threats (3 Hrs) E Commerce • Browse ecommerce website (1 Hr)	**Internet and Web Browser(15 hrs)** • Introduction to Search Engines, • Popular Search engines. • Concept of Favourites Folder. • What is an Electronic Mail. • Email Addressing, BCC and CC, Inbox, Outbox, Address book, SPAM. • Introduction to video chatting tools. • Introduction to Internet Security, Threats and attacks, Malicious Software types, Internet security products and their advantages. • IT Act & Law Introduction to Cyber Security. Introduction to Cyber Laws & IT Act. Importance of privacy and techniques to manage it. E Commerce • Definition of E commerce, Types, scope and benefits of E commerce. • Difference between E commerce and traditional commerce. • Capabilities requirements and Technology issues for E

		• Place order for items (1 Hr) • Add items to shopping Carts (1 Hr) • Do online payment through payment gateways or other payment method (1 Hr) • Do online Bill payment of service providers (1 Hr)	commerce. • Types of E commerce web sites. • Building business on the net. • Concepts of on line Catalogues, Shopping carts, Checkout pages. • Payment and Order Processing, Authorization, Chargeback and other payment methods. Security issues and payment gateways.
	Project work / Industrial visit		
	Revision		
	Examination		

Syllabus for Diploma in "IT, Networking and Cloud"			
Core Module 3 : Web Designing : 320 Hrs			
HOUR No.	**Learning outcome Reference**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
		(with indicative Hours)	
641-656	Create simple web pages using HTML 5.	**Hyper Text Mark Up Language (HTML) - (10 Hrs)** • Create HTML document using mark up Tags in HTML editor (Note pad) (1 Hr) • Open/run the html file in web browser to check the output (1 Hr) • Modify above HTML document using heading – paragraphs (1 Hr) • Modify above HTML document using Line Breaks (1 Hr) • Modify above HTML document using HTML Tags. (1 Hr) Skills on elements of HTML • Create Text, Lists, Tables and Frames (2 Hrs) • Create Hyperlinks, Images and Multimedia Working with Forms and controls. (3 Hrs)	**Hyper Text Mark Up Language (HTML) - (6 Hrs)** • Introduction to Internet, browsing, emailing • Introduction to HTML • Different editors used for Webpage Developing - Phase 5 HTML Editor, Programmer's Notepad, SynWrite Editor, PlainEdit.net, Notepad++, jEdit HTML Editor, Sublime Text 2, Sublime Text 2: unofficial documentation, Package Control: packet manager for Sublime Text 2, Adobe Brackets • Application of HTML
657-680	Create Styles of web pages using CSS.	**Cascaded Style Sheet (CSS) - (15 Hrs)** • Create CSS document by using ID selector (1 Hr) • Create CSS document by using Class selector, Universal selector and Grouping selector (1 Hr) • Create CSS document with fonts : Bold, Italics, oblique (1 Hr) • Design Style sheet document	**Cascaded Style Sheet (CSS) - (9 Hrs)** • Introduction to CSS • Limitations of CSS • Advantages of CSS • Three ways to integrate CSS • Merits and demerits of - external Style Sheets, Embedded Style Sheets

		with text transformation : Uppercase, Lower case and capitalize (1 Hr) • Create CSS document with font size in different pixels (1 Hr) • Create CSS document with font weight thinner, thicker, bold (1 Hr) • Create CSS document with alignment centre, right and left (1 Hr) • Create CSS document with background colours and font colours (1 Hr) • Create CSS document with text hovering (1 Hr) • Create CSS document with text decoration (1 Hr) • Create CSS document with block elements and objects (1 Hr) • Create Lists and Tables (1 Hr) • Create Box Model by using borders, Padding and Margin (1 Hr) • Crate CSS document by Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector) (1 Hr) • Creating page Layout and Site Designs. (1 Hrs)	
681-720	Create own account in cloud and hosting.	**Cloud Computing (25 Hrs)** Install Web server in Cloud (5 Hrs) Creating own account in cloud and launch and track no. of visitors (10 Hrs) Hosting in Amazon Web Server (10 Hrs)	**Cloud Computing (15 Hrs)** Introduction cloud computing, Amazon web server (AWS) Industrial Faculty-webinar How cloud and Webinar works

721-800	Configure embedded database with different web pages using Mongo DB	**DBMS with Mongo DB (50 Hrs.)** • Install of MongoDB in the system (2 Hrs) • Create data with the following Data types – String, Integer, Boolean, double, min/max keys, arrays, timestamp, object, Null, symbol, date, object ID, Binary data, Code, Regular Expression (3 Hrs) • Insert Document in database (1 Hr) • Update document in database (1 Hr) • Delete document in database (1 Hr) • Project document in document (2 Hr) • Create a MongoDB query to display all the documents in the collection data (Trainees data) (5 Hrs) • Create a MongoDB query to display the fields id, trainee name, lab name, Certificate No., course title, course starting date, course ending date for all the documents in the collection trainees data. (5 Hrs) • Create a MongoDB query to display the fields id, trainee name, lab name, Certificate No., course name, course starting date, course ending date for all the documents in the collection trainees data, but excluding lab name (5 Hrs) • Create a MongoDB query to display all the trainees who attended course on PHP (2 Hrs)	**Basic Concepts of DBMS (30 Hrs.)** • Purpose of database systems – Data abstraction – Database Users – Data Independence (Logical & Physical) – Instance & Schemes –Three layered Architecture of DBMS – Different Levels of Abstraction. • DATA MODELLING, E-R MODELLING • LOGICAL MODELS: Object & Record based – Object oriented model – Entity relationship models – Entity sets & relationships sets – Attributes — KEYS in entity & relationship sets: (a) super key, (b) candidate key, (c) primary key, (d) unique key — Mapping constraints – E-R Diagrams – Relational Model – Hierarchical model – Network Model. • RELATIONAL DATABASE MANAGEMENT, RELATIONAL ALGEBRA & RELATIONAL CALCULUS RDBMS Technology, The relational Data Structure, Keys, Relational Data Manipulation, The Relational Algebra, Relational algebraic Operations, The Set Operations, Fundamental Operations, Relational Calculus. Data definition language – Data manipulation language –Relational algebra — OPERATORS: select, project, join, rename etc – Simple examples.

		• Create a MongoDB query to display the 1st batch trainees of PHP (3 Hrs) • Create a MongoDB query to display the 2nd batch trainees of PHP (2 Hrs) • Create a MongoDB query to find the course where maximum trainees attended (3 Hrs) • Create a MongoDB query to find lab wise details of trainees (5 Hrs) • Create a MongoDB query with course wise details of trainees (5 Hrs) • Print the queries (5 Hrs)	Introduction to Mongo DB, Advantages of Mongo DB over RDBMS
801-880	Design and develop dynamic websites with PHP.	**PHP (Hyper Text pre processor) (50 hrs.)** <u>Handling Html Form With PHP</u> • Capturing Form Data Dealing with Multi-value filed Generating File uploaded form (3 Hrs) • Redirecting a form after submission (2 Hrs) • Write a PHP script to get the PHP version and configuration information (2 Hrs) • Write a PHP script to display the strings (3 Hr) • Create a simple HTML form and accept the user name and display the name through PHP echo statement (2 Hrs) • Write a e PHP script to display string, values within a table (3 Hrs) • Write a PHP script to count lines in a file (2 Hr) • Write a PHP function to test whether a number is greater than 30, 20 or 10 using ternary operator (3 Hrs)	**PHP(Hyper Text pre processor) (30 Hrs.)** • Decisions and loop - Making Decisions, Doing Repetitive task with looping, Mixing Decisions and looping with Html • Function - What is a function ,Define a function, Call by value and Call by reference, Recursive function • String - Creating and accessing String Searching & Replacing String Formatting String ,String Related Library function • Array - Anatomy of an Array ,Creating index based and Associative array, Accessing array Element, Looping with Index based array, Looping with associative array using each() and for each (), Some useful Library function • Working with file and Directories - Understanding file& directory

		• Write a script which will display the string (2 Hrs) • Write a PHP script which will display the colors (3 Hrs) • Write a PHP script to sorting (3 Hrs) • Write a PHP script to calculate and display average temperature, five lowest and highest temperatures in given data (2 Hr) • Write a program to calculate and print the factorial of a number using a for loop (2 Hr) • Write a PHP script using nested for loop (3 Hrs) • Write a PHP program to generate and display the first n lines of a Floyd (2 Hrs) • Write a function to calculate the factorial of a number (2 Hr) • Write a function to check a number is prime or not (1 Hr) • Write a function to reverse a string (1 Hr) • Write a PHP function that checks whether a passed string is a palindrome or not? (2 Hr) • Write a simple PHP class which displays the given string (2 Hr) • Write a PHP Calculator class which will accept two values as arguments, then add them, subtract them, multiply them together, or divide them on request (5 Hrs) • Write a PHP script to : - a) transform a string all uppercase letters. b) transform a string all lowercase letters. c) make a string's first character uppercase. d) make a string's first character of all the words	Opening and closing a file Coping, renaming and deleting a file, Working with directories Building a text editor File Uploading & Downloading, Using query string(URL rewriting), Using Hidden field ,Using cookies, Using session . • String matching with regular expression What is regular expression, Pattern matching in PHP, Replacing text, Splitting a string with a Regular Expression • Generating Images with PHP - Basics of computer Graphics Creating Image Manipulating Image Using text in Image • Database Connectivity with MySql

		uppercase (5 Hrs)	
881-960	Make websites, web servers, game frameworks, desktop and CLI applications, and IDE using Python.	**Python (50 Hrs.)** • Install Python software in the system (2 Hrs) • Print a string using print statement (2 Hrs) • Print given string using indentation (space between characters) (1 Hrs) • Define Integer Variables, floating variables and string variables (1 Hr) • Write a program to add numbers and strings to the correct list using the append list method (2 Hrs) • Write a python program to add, subtract, multiply and divide given two numbers by using arithmetic operators (2 Hrs) • Write a python program multiplying strings to form string with repeating sequence (2 Hrs) • Write a Python program to get the largest number from a list by using max and mini commands (1 Hr) • Write a Python program to find whether a given number (accept from the user) is even or odd by using if else command (2 Hrs) • Write a Python program to create a histogram from a given list of integers by using for while loop (1 Hrs) • Write a Python program to compute the greatest common divisor (GCD) of two positive integers by using loops (2 Hrs) • Write a Python program to get the least common multiple	**Python (30 Hrs)** Introduction to Python History, Features, Setting up path Basic Syntax Variable and Data Types Operator, Conditional Statements, Looping, Control Statements, String Manipulation, Lists, Tuple, Functions and Methods, Dictionaries, Functions, Modules, Input and Out Put. Exception Handling.

		(LCM) of two positive integers using if else and while commands (2 Hrs) • Write a Python program to sort (ascending and descending) a dictionary by value (2 Hrs) • Write a Python program to create a tuple. (2 Hrs) • Write a Python program to create a tuple with different data types (1 Hrs) • Write a Python program to create a set (2 Hrs) • Write a Python program to add member(s) in a set (1 Hrs) • Write a Python program to find maximum and the minimum value in a set. (1 Hrs) • Write a Python program to find the length of a set (1 Hrs) • Write a Python program to convert temperatures to and from Centigrade to Fahrenheit (2 Hrs) • Write a python program to find Fibonacci series (2 Hrs) • Write a python program to find factorial using function (2 Hrs) • Write a python program to find whether the given string is palindrome or not by using function (2 Hrs) • Write a python class to reverse a string word by word (2 Hrs) • Write a python class named as circle by a radius and two methods of computer area and perimeter of a circle (3 Hrs) • Write a python program to sort a list of elements using bubble sort algorithm (2 Hrs) • Write a python program to	

		copy content of a file to another file (3 Hrs) • Write a python program to find the frequency of words in a file (2 Hrs)	
	Project work/Industrial visit (optional)		
	Revision		
	Examination		

Syllabus for Diploma in "IT, Networking and Cloud"			
Core Module 4 : Web Development : 320 Hrs			
HOUR No.	**Learning outcome Reference**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
		(with indicative Hours)	
961-984	Understand how web works.	**Exercise duration: 15 hrs.** • Create web page content using HTML (Hyper Text Mark up Language) Tags (5 Hrs) • Enable Hypertext Transfer Protocol (HTTP) via GET and POST requests (5 Hrs) • Obtain input from users. (5 Hrs)	**Theory duration:9 hrs.** • Learn basic concepts regarding the internet, browsers, and HTML. • Use of HTML (Hyper Text Mark up Language) in web pages. • Protocols • Forms and Input • Database • User Account and security • APIs and Caching.
985-1040	Structuring the web	**Exercise duration :35 hrs.** • Divide a webpage into logical sections (1 Hr) • Set up structure of headings and paragraphs (1 Hr) • Display computer code with HTML (1 Hr) • Annotation of images and graphics. (2 Hr) • Marking abbreviations (1 Hr) • Add quotations and citations to web pages (2 Hrs) • Embed a webpage within another webpage (2 Hrs) • Add Flash content within a webpage (3 Hrs) • Create a data spreadsheet (2 Hrs) • Create HTML tables (1 Hrs) • Optimize HTML table rendering (1 Hr) • Create collapsible content with HTML (1 Hr) • Add context menus to a webpage (2 Hr)	**Theory duration :21 hrs.** • Introduction to HTML • Structuring of web page using HTML • Multimedia and embedding • HTML table and forms • APIs

		• Create dialog boxes with HTML (2 Hrs) • Add multiple languages into a single webpage (2 Hrs) • Controlling of HTML line breaking (1 Hrs) • Mark changes (added and removed text) (2 Hrs) • Add responsive image to a webpage (3 Hrs) • Add vector image to a webpage (3 Hrs) • Add a hit map on top of an image (2 Hrs)	
1041-1120	Scripting and Styling the web (CSS)	**Exercise duration:50hrs** • Apply CSS within a webpage (2 Hrs) • Apply CSS to HTML (3 Hrs) • Select elements via element name, class or ID (2 Hrs) • Select elements via attribute name and content (1 Hrs) • Apply pseudo-elements (2 Hrs) • Specify colors in CSS (2 Hrs) • Debug CSS in the browser (1 Hrs) • Style text and customize a list of elements (2 Hrs) • Add shadows to text (2 Hrs) • Size CSS boxes (2 Hrs) • Control overflowing content (1 Hr) • Control the part of a CSS box to draw the background (2 Hrs) • Create fancy boxes (also see the Styling boxes module, generally). (2 Hrs) • Use background-clip to control background image (1 Hrs) • Change the box model	**Theory duration :30 hrs.** • CSS overview • Syntax • CSS values and units • Styling text • Styling box • CSS layout

		completely using box-sizing (2 Hrs) • Control backgrounds (3 Hrs) • Apply control borders (2 Hrs) • Style an HTML table (3 Hrs) • Add shadows to boxes (2 Hrs) • Calculate specificity of a CSS selector (3 Hrs) • Control inheritance in CSS (2 Hrs) • Apply filters in CSS (2 Hrs) • Apply blend modes in CSS (1 Hr) • Apply CSS multi-column layouts (3 Hrs) • Apply CSS generated content (2 Hrs)	
1121-1200	Enhancing the web using PHP.	**Exercise duration:50 hrs.** • Create a form in PHP and apply validations. (5 Hrs) • Create a date and time from a number of parameters in mktime() (2 Hrs) • Create a date and time from the strtotime () function (2 Hrs) • Create more dates/times from strtotime () (1 Hr) • Output the dates for the next six Saturdays (3 Hrs) • Output the number of days until 10th of July (2 Hrs) • Create and retrieve a cookie (5 Hrs) • Modify a cookie value (2 Hrs) • Delete a cookie (1 Hrs) • Check if cookies are enabled (2 Hrs) • Select data with MySQLi (Object-oriented) (5 Hrs) • Select data with MySQLi (Object-oriented) and put result in an HTML table (10	**Theory duration:30hrs.** • PHP Fundamentals overview • PHP Forms, files and cookies • Form validations • Introduction to PHP Script • Looping statement in PHP Script • Working with Predefined functions • Maintaining Validations in PHP Script • Working with Different types of Mouse Events • Object Oriented Programming and PHP 5 • Debugging PHP Code • PHP Session Handling Features • Smarty installation • Handling Date & Time in PHP • Installing and Managing MySQL (access control & overview) • Understanding and using MySQL clients • Database Access, Design Patterns, Mail Function, PEAR and cURL

		Hrs) • Select data with MySQLi (Procedural) (5 Hrs) • Select data with PDO (+ Prepared statements) (5 Hrs)	
1201-1280	Java: The key language	**Exercise duration 50 hrs.** • Write a Java Programme to print Hello on Screen (2 Hrs) • Write a Java Program to find arithmetic Operations (1 Hr) • Write a Java Program to find biggest no. in given three nos. (2 Hrs) • Write a java program to print Fibonacci series without using recursion and using recursion (2 Hrs) • Java Program to Solve any Linear Equation in One Variable (3 Hrs) • Java Program to Find Inverse of a Matrix (3 Hrs) • Java Program to Perform Encoding of a Message Using Matrix Multiplication (2 Hrs) • Write a Java program to sort a numeric array and a string array (2 Hrs) • Write a Java program to remove a specific element from an array (3 Hrs) • Write a Java program to get the minimum value of year, month, week, date from the current date of a default calendar (2 Hrs) • Perform animation in applet (3 Hrs) • Write a java program to paint like paint brush in applet (2 Hrs) • Program to display analog clock in applet (3 Hrs)	**Theory duration:30 hrs.** • Introduction to Java programming • The Java Virtual Machine • Variables and data types • Conditional and looping constructs Arrays • Object-oriented programming with Java Classes and Objects • Exception handling with try-throw-catch-finally constructs • Working with types: Wrapper classes • Packages • Applets • Basics of AWT and Swing • Threads • Concepts of networking

		• Program to communicate two applets (3 Hrs) • Write a Java program to convert a hash set to a tree set (2 Hrs) • Create runnable jar file in java? (3 Hrs) • Display image on a button in swing (2 Hrs) • Program to change the component color by choosing a color from ColorChooser (2 Hrs) • Program to create a notepad in swing? (3 Hrs) • Program to inherit Frame class (2 Hrs) • Program to perform two tasks by two threads (3 Hrs)	
	Project work / Industrial visit		
	Revision		
	Examination		

Syllabus for Diploma in "IT, Networking and Cloud"			
Core Module 5 : Business Data Analytics : 320 Hrs			
HOUR No.	**Learning outcome Reference**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
		With Indicative Hours	
1281-1360	Understand business analytics and develop business intelligence.	**Introduction to Business Analytics Overview (50 Hrs.)** • Use Excel for under standing different types of data (Integer, double, text, date) (5 Hrs) • Perform operations on different data types. (5 Hrs) • Segregate data in different sheets. (5 Hrs) • Calculate arithmetic mean, geometric mean and Harmonic mean (5 Hrs) • Calculate median from raw & grouped data (5 Hrs) • Calculate mode for row & grouped data (5 Hrs) • Calculate standard deviation for set of data (5 Hrs) • Calculate standard variance for a set of data (5 Hrs) • Online analytics processing using (OLAP) tools. (5 Hrs) • Use OLTP for CRM and retail sales using web focus info assist or Excel (5 Hrs)	**Business Analytics (30 Hrs.)** Introduction to business analytics and concepts of business analytics. Trends in business analytics. Descriptive analytics: Introduction to statistics, Types of data, Measure of Central Tendency, Mean – Arithmetic mean, Geometric Mean, Harmonic Mean, Median – Raw and Grouped Data and Mode - Raw and Grouped Data, Measure of Dispersion – Standard deviation, Variance, properties of variance and standard deviation and its usage in business, analytics project. Concepts on OLAP and OLTP
1361-1440	Analyze data using statistical and data mining techniques for business intelligence.	**Business Analytics Foundation (50 Hrs.)** • Segregate structured data & un structured data (5 Hrs) • Exercises on data integration (5 Hrs) • Exercises on data clearing (5 Hrs) • Create data dimension (5 Hrs) • Exercises on data ware housing.	**Business Analytics Foundation (30 Hrs.)** BI component framework, business intelligence for management, operational BI, BI for process and performance improvement, Role of Business Intelligence in Improve customer experience, business intelligence role and

		(5 Hrs) • Exercises on data visualization (5 Hrs) • BI case studies to improve customer experience in roles & responsibilities. (5 Hrs) • Case studies on self service& collaborative BI (5 Hrs) • Exercises on BI strategies (5 Hrs) • Exercises on BI project management (5 Hrs)	responsibilities, Popular BI tools in the market.
1441-1520	Understand case studies for predictive models.	**Predictive analytics modeler I (50 Hrs.)** • Exercises on data representation & cluster analysis (2 Hrs) • Case studies on different patterns of data (3 Hrs) • Case studies on pre processing the data (2 Hrs) • Case studies on transforming the pre processed data (3 Hrs) • Case studies on segregating preprocessed data into different patterns. (2 Hrs) • Case studies on Evaluating the data patterns (3 Hrs) • Case studies on Tread Analysis. (2 Hrs) • Case studies on statistical approach for data mining through (3 Hrs) • Bayesian network (5 Hrs) • Regression Analysis (5 Hrs) • Correlation Analysis (5 Hrs) • Cluster Analysis (5 Hrs) • Case studies on CRISP – DM model (5 Hrs) • Case studies on data partitioning. (5 Hrs)	**Predictive analytics modeler I (30 Hrs.)** Concept of data mining techniques, concepts of data mining model with its development and deployment in business scenario. Data mining models – CRISP-DM model, understanding of data and its preparation techniques for the better model building, introduction to sampling and data partitioning in data mining project
1521-1600	Develop case studies for	**Predictive analytics modeler II (50Hrs.)**	**Predictive analytics modeler II (30 Hrs.)**

	predictive analytical models.	• Exercise for machine learning approach : (15 Hrs) I. Case studies on Decision tree induction method II. Case studies on inductive concept learning III. Case studies on conceptual cluster learning. • Exercise on data base oriented approach : (15 Hrs) I. Case studies on attribute – oriented induction II. Case studies on iterative database scanning III. Case studies on attribute focusing • Exercise on other approaches (10 Hrs) I. Case studies on neural networks II. Case studies on Rough sets. III. Case studies on Visualisation. • Case studies on odds and odds ratio (10 Hrs)	Concepts of machine learning approach for data mining using decision tree inductive concept, conceptual cluster, attribute oriented induction, iterative database scanning, attribute focusing, neural networks, rough sets, visualization. Concepts of odds and odds ration
	Project work / Industrial Visit		
	Revision		
	Examination		

Core Module 1 : Computer Hardware Maintenance : 320 Hrs	
Project work/ Industrial Visit	40 Hours
Revision	16 Hours
Examination	8 Hours
Total number of Hours (Instructional Hours+Project+Revision+Examination)	**384 Hours**

Core Module 2 :Computer Networking : 320 Hrs	
Project work/ Industrial Visit	40 Hours
Revision	16 Hours
Examination	8 Hours
Total number of Hours (Instructional Hours+Project+Revision+Examination)	**384 Hours**

Core Module 3 : Web Designing : 320 Hrs	
Project work/ Industrial Visit	40 Hours
Revision	16 Hours
Examination	8 Hours
Total number of Hours (Instructional Hours+Project+Revision+Examination)	**384 Hours**

Core Module 4 : Web Development : 320 Hrs	
Project work/ Industrial Visit	40 Hours
Revision	16 Hours
Examination	8 Hours
Total number of Hours (Instructional Hours+Project+Revision+Examination)	**384 Hours**

Core Module 5 : Business Data Analytics : 320 Hrs	
Project work/ Industrial Visit	40 Hours
Revision	16 Hours
Examination	8 Hours
Total number of Hours (Instructional Hours+Project+Revision+Examination)	**384 Hours**

Syllabus for Diploma in "IT, Networking and Cloud"			
Elective Subject 1 : Cloud Application Developer : 320 Hrs.			
Hour No.	**Learning outcome**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
		(with indicative Hours)	
1-200	Understand the Cloud architecture patterns, Working with the WebSphere /Deployment environment.	Following operations will be performed on the Cloud platforms: (30 Hrs) • Overview of cloud platform dashboards. (IBM Blue mix) • Operations like creation, launch, security, and cleaning of instances will be performed. Skills on Essentials of Cloud Application Development on IBM Bluemix (35 Hrs) • Bluemix and the Cloud Foundry command line interface (CLI) • Develop Bluemix applications with Eclipse • Develop Bluemix applications with IBM Bluemix DevOps services • Bluemix with Cloudant • Build a mobile data Bluemix application • Extend the Bluemix mobile data application to access it from a mobile web application Skills on Developing Cloud Applications with IBM SDK for Node.js (30 Hrs) • Set up your Node.js development environment in IBM BlueMix • Asynchronous I/O with call-back • Node packages	(**75 Hrs of Theory)** • Introduction to cloud and IBM Bluemix services • Getting started with IBM Bluemix and develop Bluemix applications on a local workstation • Introduction to data services in IBM Bluemix and Mobile Data services • Introduction to server-side JavaScript and Express: a web application framework • Overview of the Liberty profile along with Deploying applications to the Liberty profile

		Skills on Working with Liberty Profile on Bluemix (BYOE) (30 Hrs) • Getting started with the Liberty profile • Binding the Bluemix Liberty Profile to a MongoDb service • Working with the Liberty profile	
201-320	Develop Cloud applications.	Projects: (120 Hrs) • Develop an application using Node.js Example: 1.Simple Chat application 2. Hello World Deploy the created application into Liberty profile	
	Revision		
	Examination		

Syllabus for Diploma in "IT, Networking and Cloud"			
Elective Subject 2 : Cloud Enterprise Developer : 320 Hrs.			
Hour No.	**Learning outcome**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
		(with indicative Hours)	
1-200	Build a web application with the Express framework, Use Web Sphere Development Tools to deploy applications to a server.	Skills on Migrating Application to the Cloud on Bluemix (50 Hrs) • Setting up the environment • Deploying Tomcat application to Bluemix • Installing and running the migration analysis tools • Creating a database service in Bluemix • Deploying the application in Bluemix • Testing the application • Deleting the application • Installing a local Tomcat server into Eclipse • Importing and running the application in Eclipse • Running the cloud migration analysis tools • Analyzing the results • Creating database service in Bluemix • Deploying the application in the cloud • Testing your application (optional) • Deleting the application • Running the document manager application on-premises • Setting up the migration environment • Migrating the server configuration by using the configuration migration tool. • Importing and analysing the application • Migrating the application	**(75 Hrs of Theory)** • Migrating application to Bluemix • Additional considerations Code commit • Code deploy • Code pipeline • Kudu • Cloud & cyber Security(Advance) • Bluemix integration • Secure gateway • API and data integration

		• Deploying the application to Bluemix Skills on Cloud & cyber Security (Advance) (25 Hrs) • Setting up security functionalities • Setting up of alarms Skills on Integration of Bluemix Applications with On-premises Resources On-premises Resources (50 Hrs) • Building an IBM Container that represents a back-end system • Testing the application • Setting up the Eclipse development environment • Setting up IBM Secure Gateway • Defining JDBC access through IBM Secure Gateway • Enabling REST, Web Services, and JMS access through IBM Secure Gateway • Establishing Client TLS • Establishing Application TLS • API Management • Connect & Compose • DataWorks • User-defined services • Cleaning up your resources	
201-320	Deploy cloud application and cloud integration.	Projects: (120 Hrs) Create a small project using java or use an already created application to deploy the application on Bluemix platform. Case study: Security breaches • Security functionalities on different cloud platforms. Develop a security and integration framework of the application /project deployed on Bluemix platform.	
	Revision		
	Examination		

Syllabus for Diploma in "IT, Networking and Cloud"			
Elective Subject 3 : Web Development using Java : 320 Hrs.			
Hour No.	**Learning outcome**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
		(with indicative Hours)	
1-80	Develop the real time scenarios based on OOPs concepts and Java .	**JAVA Programming through OOPs Concepts (50 Hrs)** • Write a program to demonstrate encapsulation & Write a Java program to print 'Hello' on screen and then print your name on a separate line. (1 hr) • Write a program in Java to display the pattern like right angle triangle with a number. (1 hr) • Write a program to demonstrate static and dynamic polymorphism. (2 hrs) • Write a program to demonstrate method overloading and overriding (1 hr) • Write a program to create a constructor for a class. (1 hr) • Write a Java program to sort ascending / Descending of given array (1 Hr) • Write a Java program to add two matrices (1 hr) • Write a Java program to test the equality of two arrays (1 Hr) • Write a Java Programme to find that the given string is Palindrome ? (1 Hr) • Write a program to create wrapper classes. (2 hrs) • Write a program to demonstrate single level, multiple level inheritance. (3 hrs) • Write a program to demonstrate super keyword (2 hrs) • Write programs to demonstrate	**(30 Hours Theory)** • Introduction to java, Difference between structural programming and oops programming, OOPs concepts, Encapsulation, Class & Objects, Hello.java,Java environment setup, compilation & execution. • Java primitive data types including int, float, char, String, Boolean, and double. • Define Java constants. Declare, assign, and initialize variables. • Write simple arithmetic statements. Understand operator precedence. • Understand arithmetic and logical operators. • Explain the difference between primitive and reference data types • Use Java decision structures including IF, IF...ELSE, nested IF, and Switch statements. • Use Java logical operators including AND, OR, and the conditional NOT • Polymorphism : Static & Dynamic Polymorphism. • Constructors, Difference between constructors and

		the interfaces in java (3 hrs) • Write programs to demonstrate the abstract class in java (2 hrs) • Write program to create and use a package in java (3 hrs) • Write a program to demonstrate inner classes in java (2 hrs) • Write programs to demonstrate try-catch blocks in java (3 hrs) • Write program to demonstrate throws keyword in java (2 hrs) • Write program to demonstrate finally keyword in java (2 hrs) • Write a program to Create user defined exceptions in java (1 hrs) • Write a program to demonstrate multi-threading in java (2 hrs) • Write a program to create login page using java AWT (3 hrs) • Write a program to create different grid layouts using java AWT (2 hrs) • Write a program to create job Registration form using java AWT (3 hrs) • Write a program to handle the events for "Sign UP" and "Login" button clicks (2 hrs) • Write a program to handle the events in registration form (3 hrs)	functions. • Declare and initialize a Java array. • Understand the concepts String manipulation. • String class & string buffer class. • Wrapper Classes • Inheritance: Single level, Multi level, Multiple. • Super Class • Interfaces • Abstract Classes • Packages • Access Specifier • Inner Classes • Exception Handling • Java AWT. • Event Handling in java.
81-160	Develop Web pages using Java.	**<u>Java Servlets. (50 Hours)</u>** • Write simple Servlet Hello World, compile and deploy it (2 hrs) • Write simple Servlet program to pass and read values to Helloform using GET method.(3 hrs) • Write simple Servlet program to pass and read values to Helloform using POST method.(2 hrs) • Write a simple Servlet program to read values from check box. (3 hrs) • Write a servlet program to read HTTP header information. (2 hrs)	**(Theory 30 Hours)** • What is servlets, Servlet package. • Setting up servlet environment, servlet life cycle. • Servlets form data. • Servlet client HTTP request, HTTP server response. • Status codes. • Filters. • Exception Handling.

		• Write a servlet to send 407 error code to client browser and to display message as "Need Authentication!" (3 hrs) • Write Servlet program to print client IP, Date & Time using servlet filters. (5 hrs) • Write a program to perform basic exception handling in servlets. (5 hrs) • Write a servlet program to set cookies to First name, Second Name, Mobile No, Email ID fields in a form. (5 hrs) • Write a servlet program to read cookies names and values. (2 hrs) • Write a Servlet program to display the session information of webpage. (3 hrs) • Write a servlet program to access employees table from database. (5 hrs) • Write a servlet program to edit, update and delete employees information in database. (5 Hrs) • Write a servlet program to display current data & time on webpage.(2 hrs) • Write a servlet program for auto page refresh. (3 hrs)	• Cookies & Sessions. • Database connectivity. • Servlets date & time. • Auto page refresh.
161-240	Establish database support for dynamic WebPages.	**<u>JDBC (50 Hours)</u>** • Create a connection to database (MS-Access/MySQL/Oracle) using JDBC. (3 hrs) • Create a database using JDBC. (2 hrs) • Select database using JDBC application. (2 hrs) • Drop existing database using JDBC application. (1 hrs) • Create statement and result set. (2 hrs) • Create a table using JDBC	**(Theory 30 Hours)** • What is JDBC, JDBC architecture. • JDBC Package, JDBC-SQL-syntax. • JDBC Environment setup. • Creating JDBC application. • JDBC Driver and its types. • JDBC connections, statements, result sets, data types.

		application. (3 hrs) • Delete the table using JDBC application. (2 hr) • Insert the records using JDBC application. (5hrs) • Select the records using JDBC application. (5 hrs) • Edit & Update the records using JDBC application. (5 hrs) • Delete the record using JDBC application. (3 hrs) • Conditionally Select the records from table by WHERE clause using JDBC application. (2 hrs) • Conditionally select the records from table by LIKE clause using JDBC application. (2 hrs) • Sort the records using JDBC application. (3 hrs) • Store the image in database using JDBC application. (5 hrs) • Retrieve the image from database using JDBC application. (5 hrs)	• Exceptions.
241-320	Develop Website using Java and deploy in cloud.	Projects: (120 Hrs) Create a simple organization website with employee registration and login	
	Revision		
	Examination		

Elective Subject 1 : Cloud Application Developer : 320 Hrs.	
Revision	16 Hours
Examination	8 Hours
Total number of Hours (Instructional Hours+Revision+Examination)	**344 Hours**

Elective Subject 2 : Cloud Enterprise Developer : 320 Hrs.	
Revision	16 Hours
Examination	8 Hours
Total number of Hours (Instructional Hours+Revision+Examination)	**344 Hours**

Elective Subject 2 : Web Development using Java : 320 Hrs.	
Revision	16 Hours
Examination	8 Hours
Total number of Hours (Instructional Hours+Revision+Examination)	**344 Hours**

9. SYLLABUS – EMPLOYABILITY SKILL

1. English Literacy	Duration : 40 Hrs.
Pronunciation	Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech)
Functional Grammar	Transformation of sentences, Voice change, Change of tense, Spellings.
Reading	Reading and understanding simple sentences about self, work and environment
Writing	Construction of simple sentences Writing simple English
Speaking / Spoken English	Speaking with preparation on self, on family, on friends/ classmates, on know, picture reading gain confidence through role-playing and discussions on current happening job description, asking about someone's job habitual actions. Cardinal (fundamental) numbers ordinal numbers. Taking messages, passing messages on and filling in message forms Greeting and introductions office hospitality, Resumes or curriculum vita essential parts, letters of application reference to previous communication.
2. Communication Skills	Duration : 40 Hrs.
Introduction to Communication Skills	Communication and its importance. Principles of Effective communication. Types of communication - verbal, non verbal, written, email, talking on phone. Non verbal communication -characteristics, components-Para-language Body language Barriers to communication and dealing with barriers. Handling nervousness/ discomfort.
Listening Skills	Listening-hearing and listening, effective listening, barriers to effective listening guidelines for effective listening. Triple- A Listening – Attitude, Attention & Adjustment. Active Listening Skills. Characteristics Essential to Achieving Success The Power of Positive Attitude Self-awareness Importance of Commitment Ethics and Values

	Ways to Motivate Oneself Personal Goal setting and Employability Planning
Motivational Training	Characteristics Essential to Achieving Success. The Power of Positive Attitude. Self awareness. Importance of Commitment Ethics and Values Ways to Motivate Oneself Personal Goal setting and Employability Planning.
Facing Interviews	Manners, Etiquettes, Dress code for an interview Do's & Don'ts for an interview.
Behavioral Skills	Problem Solving Confidence Building Attitude Analytical and Quantitative Skills
3. Entrepreneurship Skills	Duration : 20 Hrs.
Concept of Entrepreneurship	Entrepreneur - Entrepreneurship - Enterprises:-Conceptual issue Entrepreneurship vs. management, Entrepreneurial motivation. Performance & Record, Role & Function of entrepreneurs in relation to the enterprise & relation to the economy, Source of business ideas, Entrepreneurial opportunities, The process of setting up a business.
Project Preparation & Marketing analysis	Qualities of a good Entrepreneur, SWOT and Risk Analysis. Concept & application of PLC, Sales & distribution Management. Different Between Small Scale & Large Scale Business, Market Survey, Method of marketing, Publicity and advertisement, Marketing Mix.
Institutions Support	Preparation of Project. Role of Various Schemes and Institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non financing support agencies to familiarizes with the Policies / Programmes & procedure & the available scheme.
Investment Procurement	Project formation, Feasibility, Legal formalities i.e., Shop Act, Estimation & Costing, Investment procedure - Loan procurement - Banking

	Processes.
4. Productivity	Duration : 20 Hrs.
Benefits	Personal / Workman - Incentive, Production linked Bonus, Improvement in living standard.
Affecting Factors	Skills, Working Aids, Automation, Environment, Motivation - How improves or slows down.
Comparison with developed countries	Comparative productivity in developed countries (viz. Germany, Japan and Australia) in selected industries e.g. Manufacturing, Steel, Mining, Construction etc. Living standards of those countries, wages.
Personal Finance Management	Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and Insurance.
5. Occupational Safety, Health and Environment Education	Duration : 20 Hrs.
Safety & Health	Introduction to Occupational Safety and Health importance of safety and health at workplace.
Occupational Hazards	Basic Hazards, Chemical Hazards, Vibroacoustic Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards. Occupational health, Occupational hygienic, Occupational Diseases/ Disorders & its prevention.
Accident & safety	Basic principles for protective equipment. Accident Prevention techniques - control of accidents and safety measures.
First Aid	Care of injured & Sick at the workplaces, First-Aid & Transportation of sick person.
Basic Provisions	Idea of basic provision legislation of India. safety, health, welfare under legislative of India.
Ecosystem	Introduction to Environment. Relationship between Society and Environment, Ecosystem and Factors causing imbalance.
Pollution	Pollution and pollutants including liquid, gaseous, solid and hazardous waste.

Energy Conservation	Conservation of Energy, re-use and recycle.
Global warming	Global warming, climate change and Ozone layer depletion.
Ground Water	Hydrological cycle, ground and surface water, Conservation and Harvesting of water.
Environment	Right attitude towards environment, Maintenance of in -house environment.
6. Labour Welfare Legislation	Duration : 10 Hrs.
Welfare Acts	Benefits guaranteed under various acts- Factories Act, Apprenticeship Act, Employees State Insurance Act (ESI), Payment Wages Act, Employees Provident Fund Act, The Workmen's compensation Act.
7. Quality Tools	Duration : 10 Hrs.
Quality Consciousness	Meaning of quality, Quality characteristic.
Quality Circles	Definition, Advantage of small group activity, objectives of quality Circle, Roles and function of Quality Circles in Organization, Operation of Quality circle. Approaches to starting Quality Circles, Steps for continuation Quality Circles.
Quality Management System	Idea of ISO 9000 and BIS systems and its importance in maintaining qualities.
House Keeping	Purpose of House-keeping, Practice of good Housekeeping.
Quality Tools	Basic quality tools with a few examples.

ANNEXURE-I

List of Tool & Equipment

1. Trainees Tool Kit (For 20 Trainees + 1 Trainer)

S No.	Name of the Item	Specification	Quantity
1	Connecting screwdriver	100 mm	21 Nos.
2	Neon tester	500 V	21 Nos.
3	Screw Driver Set (set of 5)		21 Nos.
4	Insulated combination pliers	150 mm	21 Nos.
5	Insulated side cutting pliers	150 mm	21 Nos.
6	Long nose pliers	150 mm	21 Nos.
7	Soldering iron	25 W. 240 V	21 Nos.
8	Electrician knife		21 Nos.
9	Tweezers	100mm	21 Nos.
10	Digital Multimeter		21 Nos.
11	Soldering Iron Changeable bits	15 W	21 Nos.
12	De- soldering pump		21 Nos.

2. List of Tools required

Sl. No.	Name of the Item	Specification	Quantity
1	Crimping tool (pliers)		2 Nos.
2	Soldering Iron	25W	6 Nos.
3	Screw driver	150mm	4 Nos.
4	Allen Key set (set of 9)		2 Sets

3. Tools & Equipment

Sl. No.	Name of the Item with Specification	Specification	Quantity
1	Server Computer Make-HP, Model-HPE ML150 Gen9, Max Scalability-2, Configured-Intel® Xeon® E5-2609v4, Memory Max Scalability-16 DiMM Slots, Memory Configured-16 GB DDR4-2400 R Memory, Max Scalability-4LFF(3.5inch) Hot Plug Drive, Configured-Open Bay, HP H240 12Gb 2-ports Int Smart HBA, HP SATA 9.5 JB Optical HDWR, Max Scalability-Hot Plug| Hot Swap, Configured-2 x HP 900W AC 240VDC Power Module, Network Controller-Broadcom 5717	1.7GHz/8-core/20MB/85W	01 No.

	Dual-port 1Gb, Management-HP iLO (Firmware: HP iLO 4), Additional HDD-HP 1TB 6G SATA 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive, Additional OS-Windows Server R2 STD 2012 & No Cal(ROK), K.B. & MOUSE with 20" LED Monitor.		
2	Desktop Computer	: Intel Core i5-6500 Processor / Q 170 chipset / 4 GB DDR4 Ram / 1 TB HDD / DVD R/w / 19.5" TCO Certified / 30 L MT CHASSIS / Three Years On-site warranty/ 90% Power Efficiency/ USB Keyboard & Mouse .	20 Nos.
3	Laptop(Intel corei5/ 7200/ 8 GB/ 1TB/ DVD/ 14.1" Screen/ Win 10 Pro) Processor Generation - 7th Processor - Intel Core i5-7200U (upto 3.1 GHz, 3 MB cache, 2 cores), Graphics Type – Integrated, Graphics Memory -	GB Hard Disk Drive Size - 1000 GB.	01 No.
4	Laser Jet Printer: Print Speed (A4)- Mono – 25 PPM, Print Speed (A4)-	Color - 10 PPM, Network Capability, Simplex, Paper Size - A4.	01 No.
6	Network Printer: Print Speed (A4)- Mono - 35 PPM Print Speed (A4)- Color - 0 PPM Network Capability Simplex ,Paper Size –A4,A3,	1200x1200 dpi , 256 MB Memory.	01 No.
7	5 KVA online UPS		02 Nos.
9	DLP Projector: Front Projection Method, Native Resolution - Brightness - 4000 Lumens, Zoom Feature, Aspect Ratio - 4:3.	1024 x 768 (XGA)	01 No.
10	Power Meter		01 No.
11	Crimping Tools		10 Nos.
12	Computer Tool Kits		07 Nos.
13	Mother Boards (of different types)		07 Nos.
14	Cabinets		07 Nos.
15	Processors (of different make)		07 Nos.

16	Hard Disk	500 GB	07 Nos.
17	Optical Drives		07 Nos.
18	LCD/LED Monitors: Screen Size (Diagonal) - 45.5 - 47.5 cm, Panel Type - Twisted Nematic (TN) , Resolution - 1366 x 768 Pixels , Brightness - 200 Nits, Response Time - 10 millisecond		07 Nos.
19	Pen Drives		04 Nos.
20	External Hard Disks:	500 GB,Read speed - 300 mbps, Write speed - 200 mbps, Interface - USB 2.0.	02 Nos.
21	External DVD Writer: Type - AC adapter, Nominal Voltage - 230 V/AC, Fixed out put connecter, Out put cable length	8.1.14 cm.	05 Nos.
22	Keyboards		07 Nos.
23	Mouse		07 Nos.
24	Anti Static Pads		07 Nos.
25	Anti static wrist wraps		07 Nos.
26	SMPS		07 Nos.
27	Blue-Ray drive and player		02 Nos.
29	Network storage		02 Nos.
30	Card reader		02 Nos.
31	Game Video card		02 Nos.
32	Surround sound Speakers		02 Nos.
33	Web Cam: Type of Video Conferencing System - End point based, Minimum Bandwidth - .384 Mbps, PCM Supported Audio Coding Standards.		02 Nos.
34	Different types of memory cards		02 nos. each
35	Laptop Kits		12 Nos.
36	Laptop spares – Cabinet with display, memory, hard disk, battery pack, keyboard membrane, chargers		As required
37	Air Conditioners 1207 CFM, Dual Rotary Compressor.	(1.5 Ton): Split AC, 1.5 ton,	02 Nos.
38	Scanner		01 No.
39	Modem		01 No.
40	Telephone Line		01 No.
41	Broad band Internet Connection		01 No.
42	Fire Fighting Equipment		02 Nos.
43	Hardware & Network Trainer Kit		05 Nos.
44	Wireless Network Adaptor		10 Nos.

45	Wireless Access Point		05 Nos.
46	Router		05 Nos.
47	Managed Layer	2 Ethernet switch 24 port	02 Nos.
48	Managed Layer	3 Ethernet switch 24 port	02 Nos.
49	Network Training System		02 Nos.
50	LAN Protocol Simulation and Analyser Software		02 Nos.
51	Network and Internet Security Trainer		02Nos.
52	LAN cable tester		02 Nos.
53	Network Cables – UTP, Coaxial, flat , ribbon		As required
55	Connectors for cables		As required
56	Media Converter		04 each
57	24 port UTP jack panel		02 Nos.
58	SC couplers		10 Nos.
59	SC Pigtails		10 Nos.
60	RJ-45 Connectors		As required
61	Fluke Meter		02 Nos.
62	Switch with POE ports		02 Nos.
63	POE adaptors		02 Nos.
64	Network Camera (outdoor/indoor)		02 No. each
65	Hand Held Vacuum cleaner		01 No.

4. List of Software

S No.	Name of the Item with Specification	Specification	Quantity
1	HTML-5, CSS, PHP, Python, My SQL, Mongo DB, Java, Linux		All Open Tools
2	Antivirus (20 user license)		01 No.
3	Network Management Software		01 No.
4	Data Recovery software		01 No.
5	MS Windows 20 user license		01 No.
6	MS Office 20 user license		01 No.
7	IBM Blue Mix Platform		20 user
8	Azmazon Web Server		20 user
9	High Bandwidth Internet Connection		20 user
10	Common Linux Software packages – alsa-lib, grep, LDAP		1 No. each
11	Windows Server 2003/2008		1 No.
12	Windows 7 after versions 64-bit, 3GHz minimum quad-core processor		1 No.
13	SQL Server		1 No.
14	Tomcat Server/ISS Server		1 No.

Furniture

S No.	Name of the Item with Specification	Specification	Quantity
1	Pigeon hole cabinet :	20 compartments	01 No.
2	**Faculty table:** wood desk with a clean top for more working space Neat wiring flow with cut-outs on the sides Free standing, Pedestal for adequate personal storage. Work Desk 1 : 1200(w)x600(d)x740(h) Work Desk 1 : 1500(w)x750(d)x740(h) Pedestal : 404(w)x460(d)x685(h) **Faculty Chair:** Ergonomically contoured chairs for perfect back support, Height adjustable back to adjust personalized lower back, Height adjustable arms, Seat depth adjustment for perfect thigh support, GREENGUARD Certified.	Model: Versa, 76.1cm (w)x 76.1 cm(d)x97.3c m – 114.8 cm (h)x 43.6 cm – 53.6 cm (seat height)	01 each (for class room & laboratory)
4	Functional 2 seater Desk-cum-Bench solution with shelf for trainees	Model : Scholar, width 1048 mm, Depth : 895 mm and Height 750 mm	10 Nos.
5	Computer Table with top made-up of 15mm Medium Density Fibre, all the other panels are made of Particle board, with vacuum lamination with appropriate lapping	Model : caliber 201, Width : 645mm, Depth : 480mm, Height : 735mm	20 Nos.
6	Operators chair with Backrest height Adjustment , Pivoted backrest, Plastic Back Cover, Footrest Assembly, Moulded Foam, Pneumatic height adjustment, Swivel Mechanism, Twin wheel castors	Model Pch 4103, Width : 65 cm, Depth 65 cm, Height 68-89.5 cm, seat height 44-56.5 cm	20 Nos.
7	Printer table can be varied as per local specifications	650X500X750mm	03Nos.
9	Storage cabinet	60X700X450mm	01No.
10	White Board : Aluminum material wall mounted Erasable white board is dent and scratch free, Magnetic surface to easily display posters, Porcelain on steel,	72.0" (w) x 48.0" (h), weight 49.0lbs, Magnet Receptive, white color.	01 No.
11	Steel Almirah : Storwel Plain	916 cm (w) x 486 cm (d) x 1981 cm (h)	01 No.

ANNEXURE-II

FORMAT FOR INTERNAL ASSESSMENT

Name & Address of the Assessor:		**Year of Enrollment:**
Name & Address of ITI (Govt./Pvt.):		**Date of Assessment:**
Name & Address of the Industry:		**Assessment location: Industry / ITI**
Trade Name:	**Examination:**	**Duration of the Trade/course:**
Learning Outcome:		

S No.	Candidate Name	Father's /Mother's Name	Safety Consciousness	Workplace Hygiene	Attendance/ Punctuality	Ability to follow Manuals/ Written instructions	Application of Knowledge	Skills to Handle Tools & Equipment	Economical use of Materials	Speed in doing work	Quality in Workmanship	VIVA	Total Internal Assessment Marks	Result (Y/N)
Maximum Marks (Total 100 Marks)			**15**	**5**	**10**	**5**	**10**	**10**	**5**	**10**	**15**	**15**		
1														
2														