SYLLABUS

For the trade of

COMPUTER OPERATOR AND PROGRAMMING ASSISTANT

Under

CRAFTSMANSHIP TRAINING SCHEME

Revised in

2011

Government of India
Ministry of Labour & Employment (DGE&T)
CENTRAL STAFF TRAINING & RESEARCH INSTITUTE
EN-Block, Sector – V, Salt Lake City,
Kolkata-700 091

List of members attended the Trade Committee Meeting to revise the Syllabus for the Trade of **"COMPUTER OPERATOR AND PROGRAMMING ASSISTANT"** under CTS held on 12th April 2010 at I.T.I. Kubernagar, Ahmedabad, Gujarat.

Shri S.D.Lahiri, Director, CSTARI, Kolkata

Sl. No.	Name and Designation	Organisation	
1.	Nikhilbhai B.Patel IMC Chairman	Bhavani Packaging Industries. Odhav, Ahmedabad.	Chairman
2.	Mr. Shirish J. Shah, Organizer	National Institute Of Design Paladi,Ahmedabad-380007	Member
3.	Mr. D. S. Jani Press Manager	Central State Transport Printing Press, Patia, Naroda,Ahmedabad	Member
4.	Mr. Naginbhai H. Patel Proprietor,	Yellow circle , Bethak, Naroda, Ahmedabad - 382330	Member
5.	Mr. Ashutosh Mehta Centre Manager	HCL Career Development Centre, Ahmedabad	Member
6.	Amit Shah, Principal System Analyst	State Informatics Centre, National Informatics Centre Block, Gandhinagar - 382010	Member
7.	Samir S. Motwani	Buzz Nx, Ahmedabad	Member
8.	P. J. Zaveri, Computer Programmer,	L. D. Engineering College, Ahmedabad	Member
9	Mrs. Neeraj Sharma HOD,	EQDC,GIDC Electronics Estate, Gandhinagar	Member
10.	YB Prajapati, Principal	GIA, NIMA Group, Chasna	Member
11	Dharmendra Sharma	DK Scientific, Ahmedabad	Member
12	Chatwani Naresh, Lecturer	Govt. Girls Polytechnic, Ahmedabad	Member
13	Mrs MP Lad, Training Officer	A.T.I. Mumbai	Member
14	DK Nagvanshi, Voc. Instr.	R.V.T.I. Mumbai	Member
15	Sanjay Kumar Gupta, Voc. Instructor	RVTI, Vadodara	Member
16	Vaibhav Jadav, Voc. Instructor	RVTI, Vadodara	Member
17	S.A. Pandhav, Regional Deputy Director	Regional Office, Rajkot	Member
18	G.N. Parekh, Regional Deputy Director	Regional Office, Ahmedabad	Member
19	P.A. Mistry, Principal Class I	I.T.I. Kubernagar, Ahmedabad	Member
20	HD Solanki, G.I.	I.T.I. Kubernagar, Ahmedabad	Member
21	GK Wadhwa, G.I.	I.T.I. Kubernagar, Ahmedabad	Member
22	JR Pandya, Supervisor Instructor	I.T.I. Kubernagar, Ahmedabad	Member
23	DJ Modi, Supervisor Instructor	I.T.I. Kubernagar, Ahmedabad	Member
24	Smt BR Naik, G.I.	I.T.I. Kubernagar, Ahmedabad	Member
25	SR Vani, Supervisor Instructor	I.T.I. Kubernagar, Ahmedabad	Member
26	L. K. Mukherjee, Deputy Director	C.S.T.A.R.I., Kolkata	Member

GENERAL INFORMATION

1.   Name of the Trade   : Computer Operator and Programming Assistant

2.   NCO code No.   : 2139.40, 2132.10 (proposed)

3.   Duration of Craftsman Training   : One Year

4.   Entry Qualification   :Passed 12th class under 10+2 system or duly recognized Diploma in Engineering (other than Computers) from any polytechnic of 3 years duration.

5. Unit strength: 20 trainee

6. Space Norms: 70 Sq. mtrs.

7. Power Norms: 3.45 Kw

8.Qualification for Instructor:-

        Passed 3 years Diploma in Computer Science / Engineering / Technology from recognized board or institution with 2 years working experience in the relevant field.
                                OR

Passed MCA/ B-TECH/BE   in Computer Science/ Engineering/ Technology from recognized university with 1 year working experience in the relevant field.
                                OR

Passed BCA/BSc Computer Science/ DoEACC A Level from recognized university   with 2 years working experience in the relevant field.
                                OR

        NAC or NTC holder in relevant trades with three years experience
  Desirable (preference to be given while requirement): CTI Certificate holders in COPA trade

.

Duration of Training:

52 weeks (1 year). 40 hours/week.
Total time: 2080 hours

Social Studies: 2hours/week
Total Time: 104 hours

Extra Curricular Activities: 3 hours/week
Total Time: 156 hours

Time Available for Computer Theory and Practical: 2080-(104+156) =1820 hours

40-5=35 hours/week for Computer Course [Theory: Practical: 20: 80]
  - ✓ 10 Hours/week = Theory
  - ✓ 25 Hours/week = Practical

Total Time available for Theory: 10 x 52 = 520 hours
Total Time available for Practical: 25 x 52 = 1300 hours
Unit used here in the syllabus is hour. Abbreviation used T=Theory, P=Practical

Module wise Breakup of the Syllabus

	UNITS	Topics	Theory (Hours)	Practical (Hours)
Module I		**Fundamentals of Computers**		
	I	History of Computers and Fundamentals	40	
	II	Computer Hardware and Software Concepts	40	
	III	Introduction of Personal Computer and Operating Systems	80	150
	IV	Basic Concepts of Networking / Communication	30	100
	V	Concept of Information and Data Processing	15	
	VI	Computer Handling and Basic Level Troubleshooting	10	20
			215	**270**
Module II		**Basic Programming Techniques**		
	I	Flow Charts	5	
	II	Language Concepts - Introduction to C	30	220
	III	Approaching ASP.NET starting with Visual Basic.NET	145	450
			180	**670**
Module III		**Application /Working with Programming Language**		
	I	Office Automation Package	40	100
	II	Spread Sheet Package	25	60
	III	X-Base Packages	55	200
	IV	Awareness of IT Act-2000 and its Amendments and Phenomena	5	
			125	**360**
		Total	**520**	**1300**

MODULE - I
Fundamentals of Computers [T-(Theory): 215, P-(Practical): 270]

Unit-I   History of Computers and Fundamentals (T-40)
- Introduction
- Definition
- Type and classification
- Computer characteristics
- Functions

Unit-II   Computer Hardware and Software Concepts (T-40)
- Input devices
- Output devices
- CPU, Memory, Secondary Memory
- Removable Devices
- Concept of Environmental safety:- Pollution of environment due to e-waste like junk key board, components of computers and other office machineries.

Unit-III   Introduction of Personal Computer and Operating Systems (LINUX, WINDOWS-XP) (T-80, P-150)
Unit-IV   Basic concept of Networking / Communication (T-30, P-100)
Unit-V   Concept of Information and Data Processing (T-15)
Unit-VI   Concept Handling and Basic Level Troubleshooting (T-20, P-20)

MODULE - II
Basic Programming Techniques (T: 180, P: 670)
Unit-I   Flow Charts (T-5)
Unit-II   Language Concepts - Introduction to C (T-30, P-220)
Unit-III   Approaching ASP.NET starting with Visual Basic .NET (T-145, P-450)

MODULE - III
Application / Working with programming packages (T:125, P:360)
Unit-I   Office Automation Package (T-40, P-100)
Unit-II   Spread Sheet Package (T-25, P-60)
Unit-III   X-base packages MySQL (Open Source)
      Overview of VB.Net, ASP.NET (T-55, P-200)
Unit-IV   Awareness of IT Act 2000, its Amendments and Phenomena (T-5)

MODULE - I (T:215, P:270)
Fundamentals of Computers

Unit-I History of Computer & Fundamentals (T:40)

History of Computer
- Abacus of   ENIAC, Computer Generations, Languages, Software and application, Computers in India.

Computers - An Introduction
- Functions of Computer: input, processing, output, Functions of ALU, control, storage, input and output devices.
- Application of Computers: viz. Railway Reservation, Electricity / Telephone Billing and (include some e-governance applications according to respective States.)
- Networks of Computers- Homogenous, Heterogeneous Characteristics (State Wide Area Network (SWAN) concept)
- Clock Speed
- Accuracy

Functions
- Bits, bytes characters, field record, file.

Representation of data:
- Binary addition and subtraction, octal, hexadecimal, ASCII, EBCDIC, positive versus negative integers, floating point numbers.
- Higher level and Lower language.

Unit-II   Hardware and software concepts (T:40)
- Computer Hardware; electronic digital computer.
- Input device: on line data input devices & their importance, dumb terminals, voice recognition devices, Touch tone terminals, Mouse.
- Office data input: key to disk system
- Source data input: point of sale terminals, laser beam scanners, optical sense readers, optical characters readers (OCR), and magnetic ink character readers (MICR).
- Output device: Hard copy device -Dot matrix printer, ink jet printer, laser printer, plotter output.
- Soft copy device: VDU (monochrome color), LCD (liquid crystal display), audio response unit;
- CPU architecture: Overview with data flow
- Memory device: Classification of Primary Memory Devices and Flash Memories.
- Secondary memory device; Hard disk (removable/fixed), advantage and limitations of secondary storage devices & DVD Writers or Blu-ray Writers.
- Removable Drive like Pen drives and external storage devices.
- Serial, Parallel and USB Ports

Unit-III   Introduction Computer and Operating Systems:
Windows XP or Higher Version and LINUX and its flavours T-80, P-150).

INTRODUCTION TO
Personal/Desktop Computers, LAPTOP, PALM-TOP & Minimum hardware and software configuration of the above.

WINDOWS and LINUX commands-
- Installation of Operating Systems (Windows XP)
- profiling an operating system
- Booting sequence: operating system files and command processor file.
- Definition of a file; File name.
- Booting from HDD, CD or DVD or external removable devices.
- warm and cold reboot
- Multitasking and Multiprocessing
- Client Server Architecture

Using WINDOWS
- Start windows
- Using different windows simultaneously
- Moving through widows and mouse
- Maximum/Minimum windows
- Use of help feature
- Exit windows
- Starting an application
- Run and Manage multiple application
- Close applications

Using the program Manager
- Create/Add Groups using Program Manager
- Move/Copy/Delete Program Items.
- Change Programmed/their properties
- Expand compressed directories and files
- Multiple Windows

Using Desktop ICONS
- My Computer
- Network Neighborhood
- Control Panel
- Add Printer
- Create/Delete/Rename/Folder

File Management through Windows
- Select File snag Directories
- Copy, Move, Delete, Files/Directories
- Disk Operations using File Manage

Using Essential Accessories
- Starting and Using Text Editors
- Type and Edit text in a document in Text Editors

8

- Save and Print a document file in Text Editors
- Starting and using paintbrush
- Printing a drawing

Basic Shell Commands of LINUX
- Date, echo, who, is, cp, rm, mv, cd,
- Mkdir, rmdir, chmod, sort, grep, passwd, etc.

Unit-IV Basic concepts of Networking / Communication: (T-30, P100)
- Internet connection setup & sharing.
- Protocols TCP/IP, ISP, NSP ETC.
- Concept of sites & pages
- Introduction to BIML, DHTML,XML,
- Designing web-pages, Static & Dynamic.
- Concepts of Web Hosting, Web server, Application server, Database Server

Unit-V : Concept of Information & Data - Processing (T-15)
- Information concepts and processing: Evolution of Information Processing, data information, language and Communication.
- Definition of Information: difference between Data and Information.
- Data concepts: symbols which describe records reality: logical and physical concepts.
- Logical concepts of data: Entities, Attributes and Relationship.
- Physical concepts: Storage and Retrieval of data; comparison of manual and computer storage and organization of data as files.
- Data processing: Storage, retrieval and processing of data as files.
- Data processing: Storage, retrieval and processing of data, provision of Information of relevance.
- Techniques/Methods of Data processing.
- Methods of Data Security like backup, online backup, restoration etc

Unit-VI : Computer Handling and Basic Level Troubleshooting (T-10, P-20)
- Measuring Main Supply, Earth voltage & checking earthing.
- Precautionary measures in Handling /Operating.
  - VCD, CD, HDD, FDD, DVD, SCANNER
  - Modem, Keyboard, Mouse, Hub, Monitor
- Printers: Dot Matrix, Inkjet, Laser
  - Feeding paper
  - Installing the cartridge
  - Refilling the cartridge.
- Backup and Restore of DATA
  - Scheduling
  - Management Plans etc.

MODULE - II (T:180, P:670)
Basic Programming Techniques

Unit-I: Flow Charts (T-5)
- Illustrations with summing series, sorting, searching merging Analysis of algorithms-space and time trade offs.Programme documentation, style in programming, program testing, low chart and Data flow Diagrams.
- Program testing and debugging efficient programming techniques Structured programming.

Unit-II: Language Concepts (T-30, P-220)
          Introduction to C
- Overview of C
- Constants, Variables, and Data type
- Operators and Expression
- Managing Formatted / Unformatted Input and Output
- Decision making and Branching
- Decision Making looping
- Arrays
- Handling of Character Strings
- User defined Functions
- Structures and Unions
- Pointers
- File management in concepts

Unit-III: Approaching ASP.NET starting with Visual Basic .NET (T: 145, P: 450)
- Features of Visual Basic , Editions of Visual Basic, Visual Basic Terminology
- Visual Basic Terminology, Working in the development environment
- Event-Driven Programming
- Creating a program in Visual Basic, project and executable files
- Visual Basic Reference Materials
- Creating Simple Applications.

Visual Basic.NET Fundamentals.
          Introduction to Objects
- Controlling objects
- Properties , Methods and Events
- Working with Forms
- Introduction to controls
- Basic controls
- Creating a Visual Basic Applications

Working with Code and Forms
- Automatic Code completion features
- Interfacing with the user

- Using the Message box Functions
- Using the Input box functions
- Working with code statements
- Managing forms
- Working with Forms

Variables and Procedures
- Overview of variables
- Declaring Variables
- Variable scope
- Using Arrays
- User-Defined data types
- converting data types
- Using Constants
- Working with Procedures
- Working with dates and times
- Using the Format function
- Manipulating Text strings
- Writing Procedures

Controlling Program Execution
- Comparison and Logical Operators
- Using If….Then Statements
- Using select…case statements
- Overview of Looping structures
- Using Do…Loop structures
- For…Next Statement
- Exiting a Loop
- Controlling Program Flow
  While, Do While, Else If loop, SWITCH Case

Debugging
- Types of Errors
- Break Mode
- Using the Debug Toolbar
- Using the Watch Window
- Using the Immediate Window
- Using the locals window
- Tracing Program Flow with the call stack
- Using visual Basic debugging tools

Working with Controls
- Types of controls
- Overview of Standard Controls
  - Using combo box and list Box controls
- Using option button and Frame Control

11

- working with selected text
- Advanced Standard Controls
- Activex controls
- Insertable Objects
- Working with controls
- Login, Validation & Navigation Control

Data Access using the ADO.NET data Control
- Overview of Activex Data objects
- Visual Basic data Access Features
- Relational Database concepts
- Using the ADO Data control to access data
- Structured Query Language (SQL)
- SQL connection
- Manipulated Data
- Using the Data Form Wizard
- Accessing Databases
- Back up & Restore Procedure

Input Validation (and Testing of software)
- Field – Level Validation
- Using Text Box Properties to Restrict Data Entry
- Using the Masked Edit Control
- Form-Level Validation
- Form Events Used When Validating Data

Error Trapping
- Overview of Run-Time Errors
- Overview of the Error -0 Handling Process
- The Err Object
- Errors and the Calling Chain
- Errors in an Error-Handling Routine
  Exception Handling
- Inline Error Handling
- Error – Handling Styles
- General Error – Trapping Options in Visual Basic.NET
- Error Trapping - Exception Handling

Enhancing the User Interface
- Menus
- Status Bars
- Toolbars
- Adding Menus - Hyperlink

Drag-and-Drop Operations

- Overview of Drag-and-Drop Features
- Mouse Events
- Drag-and-Drop Editing Basics
- Adding Drag and Drop

More About Controls
- Collections
- Using Control Arrays

Finishing Touches
- User Interface Design Principles
- Distributing and Application
- Creating a Default Project
- Review: Steps to Creating a Visual Basic Program
- Development Resources
- Using the Package and Development Wizard - Web Services

Module- III (T:125, P:360)
Application/Working with Programming Language

Unit-I Office Automation package (T-40, P-100)
       (MS Office or Open Office: Word, Excel etc
       (Include regional language INDIC keyboard selection topic)

WORD PROCESSING PACKAGE
Basics of Word processing
- Text selection
- Opening Documents and Creating Documents
- Saving Documents/Quitting Documents
- Cursor control
- Printing Documents
- Using the interface(Menu, toolbars)
- Editing Text (Copy, delete, Move etc.)
- Finding and replacing Text
- Practicing in Regional Language.

Document Enhancement
- Adding borders and shading, Headers and Footers
- Setting Up Multiple columns, Sorting blocks, margins and hyphenating documents
- Creating Master Document, Data source
- Merging Documents
- Using mail merge Feature for Labels and envelopes

Graphics and using Templates and Wizards
- Hands-on experience in word processing under DOS
- Familiarity in Word processing under Windows,

Unit-II SPREADSHEET PACKAGE (T-25, P-60)

Usage of Ms-Excel
Worksheet Basics
- Data Entry in cells, entry of numbers, text and Formulae
- Moving data in a Worksheet
- Moving around in a Worksheet
- Selecting Data range
- Using the interface(Toolbars, Minus)
- Editing basics
- Working with workbooks
- Saving and quitting
- Cell Referencing

Formatting and calculations
- Calculations and Worksheets-Using Auto fill

- Working with formulae
- Efficient Data Display with Data formatting number formatting etc./
- Working with ranges
- Worksheets printing

Working with Graphs and Charts
- Adding/Formatting Text data with Auto format
- Changing chart types
- Creating separate, chat sheet
- Adding titles, legends and gridlines
- Printing charts.

Data base management
- Finding Records With Data form
- Adding/Deleting records.
- Filtering records in a worksheet

Unit-III X-base package (T-55, P-200) - using MySQL and MS-Access
- **What is Database Management System (RDBMS) and Relational Database Management System (RDBMS)**
- **Introduction to SQL**
  - What is SQL?
  - Data Definition Language (DDL) and Data Manipulation Language (DML)
  - Introduction to Atomic Concurrent Integrated Durable (ACID) Properties.
- **Expression**
  - Select commands
  - Using Numeric, Concatenation operator, Date, Dual Table, null values
- **Where Clause (Select Statement)**
  - Where clause
  - Comparison operators, Expression Table, Rules for writing numericals, characters, date and variable names
  - Logical operators, Truth Tables
- **SQL Operators**
  - SQL Operator, BETWEEN, AND IN, LIKE, IS NULL
- **SQL Functions**
  - Number, Character, Date, Conversion
  - Group Functions, Group by & Having Clause.
  - Joins and operators
  - SQL Queries
  - Reports

Unit-IV Awareness of IT –Act 2000, its Amendments and Phenomena (T-5)
- Provisions of act
- Types of offences, fines, imprisonment
- Cyber Crime, Cyber Law
- E-Commerce Basics (Overview of B2B, B2C, C2C), Online transactions

HARDWARE EQUIREMENT FOR
COMPUTER ORERATOR & PROGRAMMING ASSISTANT

1.   Laptop: With i770 Intel Processor, 8 GB RAM, 1 TB HDD, WI-FI with license Operating System and Antivirus - 01 Nos.

2.   File server for LAN - 01 No.
     Xeon Latest 64 bit processor or Higher with PCI Express Video Card 4GB VRAM
     8 GB RAM
     22" TFT
     Keyboard, Mouse, DVD OR BLU-RAY WRITER with latest license of OS - Server Edition
     Internet, **Antivirus - Server Edition** & UPS for Power Back up.

3.   WORKSTATION/NODES - 10 NODES
     i700 (i7) PROCESSOR or Higher
     8 GB RAM
     1 Terabyte HDD
     22" TFT Monitor101
     DVD OR BLU-RAY WRITER
     KEYBORD/INTERNET
     USB Optical Mouse, USB Keyboard with latest license of OS and Antivirus - Professional/Ultimate Edition

4.   WORKSTATION FOR MULTIMEDIA - 01 Nos.
     i700 (i7) PROCESSOR or Quadcore   or Higher
     8 GB RAM
     1 Terabyte HDD
     22" TFT Monitor101
     DVD OR BLU-RAY WRITER
     KEYBORD/INTERNET
     USB Optical Mouse, USB Keyboard with latest license of OS with Antivirus - Professional/Ultimate Edition

5.   24 PORT SWITCH WITH WIRELESS CONNECTIVITY   -As required
6.   LAB should have Structured cabling   -As required
7.   Internet or Intranet Connectivity   -As required
8.   RJ 45 CONNECTORS   -As required
9.   CAT-6 CABLE FOR LAN   -As required
10. 2 KVA ON- LINE UPS FOR SERVER   - 1 no
11. 500 VA or higher off – line UPS FOR NODES   - 10 Nos
12. COLOUR LASER PRINTER   - 1 No
13. Network MONOCHROME LASER PRINTER   - 1 No
14. OPTICAL SCANNER (DESK TOP TYPE)   - 1 No
15. WEB CAM (DIGITAL CAMERA)   - 2 Nos
16. DVD OR BLU-RAY WRITER   - 2 Nos
17. PEN-DRIVE   - 5 Nos
18. Standalone HARDDISKS   - 4 Nos
19. LCD PROJECTOR   - 1 No

20.	Network Rack	- 2 Nos
21.	LAN Setup	-As required
22.	Data Recovery Software	-As required
23.	DSL Wireless Router	- 01 No
24.	Wireless Router	- 01 No
25.	Wireless LAN Card	- 05 Nos
26.	USB Floppy Drive	- 2 Nos

SOFTWARES

Front Page, Silver light , Flash Software

SQL SERVER, VISUAL STUDIO, MICROSOFT OFFICE, OPEN Office, MySQL AND OTHER SOFTWARES, Linux or any Open Source Software.

Antivirus - Server Edition for Servers and clients / workstations in profile with validity of an year or more that can be procured on expiry.

NOTE- LATEST VERSION OF HARDWARE AND SOFTWARE should be provided

LIST OF OTHER ITEMS/ FURNITURE

1.	Vacuum cleaner	– 01 No
2.	Pigeon hole cabinet : 20 compartments	-01 No
3.	Chair and table for the instructor - 01 each (for class room & laboratory)	
4.	Dual Desk or Chair and Tables for Trainees (For the batch of 16+4=20 Trainees)	
5.	Computer table sunmica top 150X650X750 mm with sliding tray for key board and one shelf of storage	-10 Nos
6.	Operators chair (without arms mounted on castor wheels, adjustable height – 20 Nos	
7.	Door mat	-02 Nos
8.	Wall clock	-01 No
9.	Printer table 650X500X750mm can be varied as per local specifications—03 Nos	
10.	Window or Split type air conditioners 1.5 tons	– 03 Nos
11.	Storage cabinet 60X700X450mm	-01 No