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SYLLABUS FOR
**COMPUTER OPERATOR AND
PROGRAMMING ASSISTANT (COPA)**
UNDER
CRAFTSMEN TRAINING SCHEME

As approved by
GOVERNMENT OF INDIA

In consultation with
THE NATIONAL COUNCIL FOR
VOCATIONAL TRAINING

Issued by
GOVERNMENT OF INDIA
MINISTRY OF LABOUR
DIRECTORATE GENERAL OF
EMPLOYMENT & TRAINING
NEW DELHI

2007

GENERAL INFORMATION

Computer Operator & Programming Assistant
Under Craftsmen Training Scheme

Syllabus for the trade of "Computer Operator & Programming Assistant" at craftsmen level under the aegis of NCVT.

ELIGIBILITY :

Qualification: 12th class pass under 10+2 system or duly recognized Diploma in Engineering from and polytechnic of 3 years duration after class 10th.

**Duration of training : 52 weeks (1 year) 42 hours/week
5 hours / week as**

- ✓ 2 hours/week for Social Studies (As per common syllabus for all trades)
 - which includes 2 hours/ month for Practice in Hindi/Recognized Regional Language.
- ✓ 3 hours/week for Extra-Curricular-Activities.

42 - 5 = 37 hours/week for Computer Course

- ✓ 27 hours/week = Practical
- ✓ 10 hours/week = Theory

Total no. of hours for Computer Courses : $52 \times 37 = 1924$ Hrs.
Total no. of Lab (Practical) Hours : $52 \times 27 = 1404$ Hrs.
Total no. of Theory Hours : $52 \times 10 = 520$ Hrs.

Note : Time mentioned with the following contents is in Hours

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**List of members who attended the IInd meeting of Trade Expert
Committee of COPA Trade held on 27-3-2002 at ATI-EPI,
Dehradun for Revision of Syllabus.**

S.No.	Name & Designation	Organization & Address	Phone No.
1.	Shri Ashok Kumar, Director CHAIRMAN	ATI-EPI, Niranjanpur, Dehradun- 248171	723804 629310
2.	Shri Vimal Kishore, Joint Director(App. Trg)	Office of the Joint Director, Employment & Training, Govt. of Uttranchal , Niranjanpur, Dehradun, 248171	626288 625982
3.	Shri Yogesh Bangia, Dy. Director of Training	ATI-EPI, Ramanthapur, Uppal Road, Hyderabad- 500013	040- 7037266
4.	Col. P.K. Das, Incharge, Computer Programme, IGNOU	82, Green Park, Niranjanpur, Dehradun- 248171	620647
5.	Shri Rajesh Kumar, Dy. Director	Forest Survey of India, Kaulagarh Road, Dehradun-248195	750042
6.	Shri Manish Jugran, District informatics Officer	National Informatics Centre, Room No.18, Collectorate compound, Dehradun- 248001	621246
7.	Shri A.K. Narula, Manager (Programme)	IDT, ONGC Limited, Dehradun	795374
8.	Shri J.P. Singh, Sr. Engineer	HRD Centre, BHEL, Ranipur, Haridwar- 249403	485294
9.	Shri Sasidharan T.M. Tech. Officer	Software Technology Park of India, 2, Survey Chowk, Dehradun- 248001	710618
10.	Shri Yogesh Kumar Gupta, Sr. Engineer- CS	CMC Limited, 478, Street No.8, Rajendra Nagar, Dehradun	757606 754960
11.	Shri Ashok Kumar K.G., Area Manager	HCL Infosystems Limited, 1st Floor, Windlass Complex, Rajpur Road, Dehradun- 248001	650992 650973
12.	Shri Sanjay Jain Manager	Age Computers, 19- Krishan Nagar Chowk, Dehradun- 248001	750587
13.	Shri M.L. Sharma Director	IIIT Computer Centre, IInd Floor, Meedo Complex, Saharanpur Road, Dehradun- 248001	728401
14.	Shri P.D. Singh	ATI EPI Niranjanpur	629310

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OBJECTIVES OF THE COURSE :

1. Learning fundamentals of computers.
2. Identifying and checking validity of data.
3. To attain the data entry speed.
4. Providing hand-on-experience on PC/ Micro Computer.
5. Learning computer languages like C & C++.
6. Learning various packages supported by PC such as Office Automation packages (MS- Office: Word, Excel, Powerpoint etc.)
7. To develop programs from planning and flow charting to coding and debugging.
8. Stressing on business data processing and office automation.
9. Learning first aid maintenance of PC & its peripherals.
10. Learning Basic concept of networking.
11. Developing soft-skill viz work culture, house-keeping, communication skill etc.
12. Practicing of Data entry in Hindi/recognized Regional Language.
13. To have awareness of IT Act' 2000.

MODULE - 1

Fundamentals of Computers [T(Theory): 160, P(Practical): 180]

- Unit-I** History of Computers & Fundamentals (T-40)
- Introduction
 - Definition
 - Type and classification
 - Computer characteristics
 - Functions
- Unit -II** Computer Hardware and Software concepts (T-80)
- Input devices
 - Output devices
 - CPU, Memory, Secondary memory.
- Unit- III** Introduction of Personal Computer/ Microcomputer and Operating System
(UNIX, WINDOWS, MS DOS, NETWARE) (T-15, P-150)

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

- Unit- I** Programming Practice and Techniques (T-25)
- Unit -II** Program design & logic (T-25)
- Unit-III** LANGUAGE -C (T-30, P-220)
- Unit-IV** Programming and problem solving through C++ (T-60, P-200)
- Unit-V** Introduction to business Organisation (T-40, P-250)

MODULE III**Application/Working with programming packages (T:180, P:554)**

- Unit-I** Office Automation Package (T-40, P-100)
- Unit-II** Spread Sheet Package (T-35, P-100)
- Unit-III** Xbse package (T-30, P-110)
- Unit-IV** An Overview of selected packages, (T-30, P-110)
- Unit-V** Basic concept of Networking/ Communication (T-30, P-104)
- Unit-VI** Data Entry in Hindi/ Recognized Regional Language (T-10, P-30)
- Unit-VII** Awareness of IT act (T-5)
- Unit-VIII** Development of soft-skill

(Will be covered in the time allotted for **Extra-Curricular-Activities**)

MODULE - I (T:160, P:180)**Fundamentals of Computers****Unit-I History of Computer & Fundamentals (T:40)****History of Computer**

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

Computers - An Introduction

- Functions of Computer: input, processing, output, Functions of ALU, control, storage, input and output devices.

Application of Computer: viz Railway reservation, Electricity/

- Networks of Computers- Homogenous, Heterogeneous Characteristics .
- Clock Speed
- Accuracy

Functions

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

Representation of Data : Binary, binary addition and subtraction, octal, hexadecimal, ASCII, EBCDIC, Positive versus Negative integers, Floating point numbers.

- Higher level and Lower level Languages.

Unit-II HARDWARE AND SOFTWARE CONCEPTS (T:80)

- Computer Hardware; Electronic Digital Computers.
- Input devices: On line data input devices & their importance, Dumb terminals, Intelligent terminals, voice recognition devices, Touch tone terminals, Mouse.
- Offline data input : Key to disk system, Key to tape system, Key to punched card.
- Source data input : Point of Sale terminals, Laser beam scanners, Optical sense readers, Optical Character readers (OCR), Magnetic ink character readers (MICR).
- Output Devices: Hard copy device—Dot matrix printer, Ink jet printers, Laser printers, Plottrer output.
- Soft copy Devices: VDU (Monochrome & Colour), LCD (Liquid Crystal Display), Audio response unit; Micro films.
- CPU Architecture: ALU: Instruction Execution, Fetch and Execution cycles, Control unit Micro-programming concept, Speed mismatch between CPU and memory.
- Memory Devices: RAM, ROM, PROM, EPROM, ECC RAM, EDO RAM and their specifications, memory storage locations, use of memory addressing in programming.
- Secondary memory Devices: Floppy disk, hard disk (removable/ fixed), Concept of cylinders, tracks, and sectors, Advantage and Limitations of secondary storage, access time, access methods (Sequential, Direct, Indexed) & CD- ROM.

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Unit-III Introduction to PC's/Micro computers and Operating Systems :

WINDOWS-98/2000, MS DOS, NETWARE) (T-15, P-150).

INTRODUCTION TO

PC, PC/XT, PC/AT, LAP-TOP, PALM-TOP, DESK-TOP &

Minimum hardware and software configuration of the above.

DOS/WINDOWS commands-

- Profiling an Operating System
- Booting Sequence: Operating System files and Command Processor file.
- Definition of a file; File names.
- Booting from floppy and HDD.
- Warm and Cold reboot

BASIC DOS COMMANDS

Using WINDOWS

- Start Windows
- Using different windows simultaneously
- Moving through windows and mouse
- Maximize/ Minimize Windows.
- Use of help feature
- Exit Windows
- Starting an application
- Run and Manage multiple applications
- Close applications

Using the Program Manager

- Create/Add Groups using Program manger
- Move/Copy/ Delete Program Items.
- Change Programme/their properties
- Expand compressed directories and files

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Using Desk Top ICONS

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

File Management Through WINDOWS

- Select Files and Directories
- Copy, Move, Delete, Files/Directories.
- Creating and renaming Files/Directories
- Disk Operations using File Manager

Using Essential Accessories

- Starting and Using Note-Pad
- Type and Edit text in a document in Note-Pad
- Save and Print a document file in Note-Pad
- Starting and using paintbrush
- Printing a drawing

Basic Shell Commands of Unix:

- Date, echo, who, is, cp, rm, mv, cd,
- Mkdir, rmdir, chmod, sort , grep, passwd etc.

Communication & Network Concepts:

- Concepts of batch vs. on line environment.
- Single user v/s, Multiuser environment, Multi tasking and Multi-processing.
- Network management concept.
- Concept of batch files in MS DOS

Unit-IV: 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 Informa-

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- Data concepts: symbols which describe record reality: logical and physical concepts.
- Logical concepts of data: Entities, Attributes and Relationships.
- 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.

Unit- V: First aid Maintenance (T-10, P-30)

- Measuring Main Supply, Earth voltage & checking earthing.
- Precautionary measures in Handling/ Operating.
 - VCD, CD, HDD, FDD, DVD, SCANNER
 - Modem, Keyboard, Mouse, Hub, Monitor
 - UPS, CVT
- Printers: Dot matrix, Inkjet, Laser
 - Feeding paper
 - Installing the cartridge
 - Refilling the cartridge.

MODULE - II (T:180, P:670)

Basic Programming Techniques

Unit-I: Programming Practice and Techniques (T-25)

- Data capture and validation, Data entry package (Software & Practice)
- Input form design, data editing, key to disk system, validation & control.
- Laboratory exercises on data-entry (speed 8000 characters hrs.) Tele- typewriter, video display terminal, dot matrix printers.
- Exercise on data collection , data validation and data varification.
- Exercise on transferring data from one medium to another/ including

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- Illustrations with summing series, sorting, searching merging Analysis of algorithms- space and time trade offs. Programme documentation, style in programming, program testing. Flow charts and Data Flow Diagrams.
- Program testing and debugging efficient programming techniques Structured programming.

Unit- III Language C (T-30, P-220)

Introductin to C

- Overview of C
- Constants, Variables, and Data types.
- 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 C

Unit-IV Programming and problem solving through C++ (T:60, P:200)

- Over view of programming: Introduction to Computer based problem solving and strategies for the same, Programs Design and implementation issue, Algorithm, Data organization, Data Structures, Use of Procedures for Modular Design, documentation of programs and program testing.
- Fundamental of C++ Programming: Structure of C++ programming Data Type, Data Structure, Constants and variables.
- Operators: Arithmetic, Relation and Logical, Control if-then, for-while.
- Arrays: Array declaration, one and two dimensionl array- Function; General, function arguments, return value.
- Basic I/O: Formatted and unformatted I/O

Unit-V : Introduction to Business Organization (T:40, P:250)

- Introduction to Business Organization and their need.
- Introduction to data processing: Records and Files; Data collection, preparation, verification, editing and checking.
- Business files-master, processing sorting searching, merging, summarizing. Business files- Master and Transactional Files: file generation back-ups files recovery procedures.
- Introduction to Accounting and Financial management Types of accounts, books of accounts, simple accounting entries etc.

Computer Applications:

- Financial Accounting
- Pay Roll and invoicing application.
- Budgeting and Planning.
- Cost Accounting.
- Inventory and State Control.
- Sales Accounting and Sales Analysis etc.

Module III (T:180, P:554)**Application/Working with Programming Language.****Unit-I Office Automation Package (T-40, P-100)****(MS Office: Word, Excel etc.)****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

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 Mailmerge 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-35, P-100)**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, Menus)
- Editing basics
- Working with Workbooks
- Saving and Quitting
- Cell Referencing

Formatting and Calculations

- Calculations and Worksheets- Using Autofill
- 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 Autoformat

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- Changing Chart Types
- Creating Separate Chart Sheet
- Adding Titles, legends and Grindlines
- Printing charts.

Database Management

- Finding Records with Data Form
- Adding/ Deleting Records
- Filtering Records in a worksheet

Unit - III Xbase package (T-30, P-110)

- Concept of data base Management System
- Difference between data files and database files
- Creating Data Base Files and Structures
- Editing Data base Files.
- Record pointer positioning features
- Specific record locating features
- Information display commands
- Indexed files
- Create, delete, Save and recall memory variables.
- Using in-built report and label facility
- Using table facility
- Format files
- Using various functions and set commands available
- Handling of multiple database files.

Developing programmes for Commercial Application using Windows based, X-base package.

Unit-IV An Overview of Selected packages (T-30, P-110)

- Desktop publishing
- Popular packages on Communications like CCMail, PRUCOMPLUS etc.
- Presentation Graphics features, Coreldraw, Powerpoint etc.

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Unit-V Basic Concepts of Networking/ Communication: (T-30, P-104)

- Concept of Networking, LAN, WAN & Email
- Internet Connection Setup & Sharing.
- Protocols TCP/IP, FTP, ISP, NSP etc.
- Concept of Proxy server, Web server, Client server etc.
- Concept of Sites & pages
- Introduction to Biml, Dhtml, XML.
- Designing Web-Pages: Static & Dynamic.

Unit-VI Data Entry in Hindi/ Recognised Regional Language (T-10, P-30)

- Data entry

Unit- VII Awareness of IT- Act 2000 (T-5)

- Provisions of Act
- Types of offences, Fines, Imprisonment

Unit- VIII Development of Soft Skills

(Will be covered in the time allotted for **Extra- Curricular- Activities**)

- Work Culture
- House keeping
- Communication Skill
- Personality Building viz. punctuality, obedience, inter-personal-communication
- Group-activities: Sports, Debates, Tree plantation, Gardening & Incl. Visit etc.
- Preparation for Viva/ Interview.

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HARDWARE REQUIREMENT FOR COMPUTER OPERATOR & PROGRAMMING ASSISTANT

- 1. File Server for LAN 01
Processor@IG.Hz. or higher
With 32 MB CARD
128 MB RAM
40 GB HDD
CTD/ DAT
1.44 MB FDD
SVGA COLOR MONITOR 14" or above
101 KEY BOARD/ Internet
16 BIT ETHERNET CARD
17 NODES
- 2. WORKSTATION/ NODES 08
Processor @ IG. Hz or higher
128 MB RAM
10 GB HDD
1.44 MB (3.5") FDD
SVGA COLOUR MONITOR 14" or above
101- KEYBOARD/ Internet
MOUSE PS/2, 3 Button
16 BIT ETHERNET CARD
- 3. WORKSTATION FOR MULTIMEDIA
Processor @ IG. Hz or higher
128 MB RAM
SVGA COLOUR MONITOR 14" or above
DVD ROM DRIVE (Latest)
40 GB HD
1 44 FDD

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- 4. 16 PORT HUB FOR LAN 01
- 5. RJ 45 CONNECTOS CAT 5 CABLE FOR LAN
- 6. NOVEL NETWARE 3.12 OR HIGHER 20 USER
(Academic version preferably)
- 7. 2 KVA ON-LINE UPS FOR SERVER 01
- 8. 500 VA or Higher OFF- LINE UPS FOR NODES 08
- 9. 132 COLUMN DMP PRINTER (24 PIN)
- 10. DESKJET PRINTER (COLOUR) 01
- 11. OPTICAL SCANNER (Desk Top TYPE) 01
- 12. Web Cam (Digital Camera) 01
- 13. CD writer 01
- 14. Floppy Diskete 3.5" 100
- 15. Cartridge 3.5" 05

Note- Latest version of Hardware & Software should be provided

LIST OF OTHER ITEMS/ FURNITURE

- 1. Vacuum cleaner - 01
- 2. Pigeon hole cabinet: 18 compartments- 02
- 3. Chair and Table for the Instructor -01 each (for class room & Lab)
- 4. Computer Table Sunmica top 1050 x 650 x 750 mm with sliding tray for key board and one shelf for storage- 10
- 5. Operators chair (without arms mounted on castor, adjustable height, wheel, cushioned)-20
- 6. Thermometer- 01
- 7. Door Mat- 01
- 8. Wall Clock - 01
- 9. Printer Table 650 x 500 x 750 mm - 03
- 10. Window type Air conditioners 1.5 tons - 03
- 11. Storage cabinet 600 x 700 x 450 mm - 01

- (a) Application Package - Inventory control, Financial Statement, Sales analysis, data entry.
- (b) Additional equipment for institutes which are already conducting earlier courses and having equipment supplied through D.O.E.

SOFTWARE

SCO UNIX WINDOWS 98/2000, MS DOS, X-BASE, AND ALL STANDARD IBM SOFTWARE

Application package- Word processing, Inventory Control, Financial Statement, Sales Analysis.

Note- Latest version of Hardware & Software should be procured or local NIC center may be consulted.

QUALIFICATION OF INSTRUCTOR

The Instructor for the Trade should be either

- NTC in COPA with 3 years Experience
- Or Recognized Dip. in Computer Application with 3 yrs experience.
- Or "O" level from DOE with 3 yrs experience
- Or BCA from IGNOU/ other university with 2 yrs experience.