DRAFT Syllabus for Computer Application and Basic of 'C' & Python Programming

Course Name	**Computer Application and Basic of 'C' & Python Programming**
Course Code	**STC-ITE/CACP/2108**
Occupation	Computer & Programming Assistant
Job Description	The person will help in computer related operations & functions involved in office activities like Software, installations / Work with document, spread sheet & PPT. He will maintain network related issues of the office. He will also assist a programmer.
Anticipated Volume of Training	1200 Hrs (Theory: 200 Hrs + Practical: 610 Hrs + Employability Skill: 90 Hrs + OJT: 300 Hrs)
Trainees' Entry Qualification	Class 8 Pass + ITI (2 Yrs) with 2 years experience, OR Class 10 Pass + ITI (1Yr) after class 10 with 1 year experience, OR Class 10 Pass + ITI (2 yrs) after class 10, OR Class 10 Pass with 2 years experience, OR Class 10 Pass and pursing continuous regular schooling, OR 3 years diploma after class 10 or Class 12 Pass with 6 months experience, OR Previous Relevant Qualification of NSQF Level 3 with 2 yrs experience.
Trainers Qualification	M.Sc. (Comp.)/ MCA / B. Tech. with 1st Division with 1 yr minimum experience

Structure of Course:

Module No.	Outcome	Theory (Hrs)	Practical (Hrs)	Total (Hrs)
1	Use and set up the computer system with the related software in a computer following safety precautions.	05	15	20
2	Assemble, Install and replace different parts of computer.	15	45	60
3	Demonstrate the basic functionalities of different types of Operating Systems with the knowledge of installation and configuration of Windows / Linux Operating System	15	60	75
4	Perform conversion of different number systems and do arithmetic operation.	15	-	15
5	Simplify Boolean expressions & convert Boolean function to Logic diagram & Vice versa.	15	35	50
6	Write 'C' Programs using Loop, function, Arrays, Structure, & Pointers.	20	60	80
7	Write simple Python program using Python string processing functions and methods, also involving dictionaries & related operations.	20	60	80
8	Perform basic operations on Word, Excel and Power Point, like creating formatting and Editing etc.	20	75	95
9	Create database files using MS-Access & MySQL and perform different operations on a Database Table using different SQL commands.	20	60	80
10	Install & Configure a Network & identify various network media for making LAN, MAN & WAN connection.	20	70	90

Module No.	Outcome	Theory (Hrs)	Practical (Hrs)	Total (Hrs)
11	Access information from Internet using different Web Browser via World Wide Web with the basic knowledge of computer security.	20	60	80
12	Create Static and Dynamic Web Pages and its related operations using HTML tags.	15	70	85
	TOTAL:	**200**	**610**	**810**

Employability Skill: 90 Hrs
OJT: 300 Hrs

SYLLABUS:

Module No. 1: Safe working practices

Outcome

Use and set up the computer system with the related software in a computer following safety precautions.

Theory Content:

1. Scope of Computer Application Trade
2. Safety rules and safety signs
3. Types and working of fire extinguishers
4. Introduction to special keys and numeric keys and their usage
5. Get knowledge of Computer system with the concept of hardware and software

Practical Content:

1. Visit the Computer Application lab. of the institute and locate the electrical connections with the computer system setup
2. Identify the safety symbols and hazard identification
3. Practice safe methods of fire fighting in case of electrical fire
4. Use of fire extinguishers

Module No. 2: Introduction to Computers

Outcome

Assemble, Install and replace different parts of computer.

Theory Content:

Introduction to Computers

1. Evolution of computers
2. Computer hardware generations
3. Classification of Computers

4. Basic Computer Organization
5. Computer System : Hardware, Software, Data and People
6. Applications of computers in modern society

Memory and Storage Systems

1. Cache Memory
2. Primary memory: RAM,ROM
3. Secondary memory: Hard disks, CD Rom, DVD Rom, USB Flash drive etc

Input and Output Devices

1. Input Devices: Keyboard, Pointing devices, Handheld devices, Optical devices etc
2. Output Devices: Monitors, Projectors, Printers, Plotters etc
3. Study of Motherboard, SMPS, HDD

Practical Content:

1. Identify computer peripherals and internal parts (CPU, SMPS, RAM etc.) of a PC
2. Remove and refit RAM, Processor etc.
3. Identify cable connections inside a PC
4. Identify the components of a motherboard
5. Hard Disk Partitioning And formatting
6. Identify various components of HDD and write their functions
7. Install ,uninstall and make settings for the devices like keyboard, mouse, display etc
8. Installing a printer and carrying self test
9. Replacement of toner cartridge of laser printer
10. Changing mechanical parts of laser/ inkjet printers
11. To study the different expansion slots of a motherboard, set the NIC to expansion slot and to install the driver.

Module No. 3: Software and Languages

Outcome:

Demonstrate the basic functionalities of different types of Operating Systems with the knowledge of installation and configuration of Windows / Linux Operating System.

Theory Content:

Software and Languages

1. Definition and Functions of software

Types of software

1. System Software : Operating System, Utility Programs, Device Drivers, Language Translator, Linker, Loader
2. Application Software: General purpose and Application purpose software

Operating System

1. Definition and Functions of OS
2. Types of OS
3. Booting, Buffering, Concept of Virtual memory
4. Directory and file structure
5. DOS commands and their uses

6. MS Windows OS
7. UNIX Commands and uses

Programming Languages

1. Generation of Comp. Language
2. Classification of Language: Machine language, Assembly language and High level language

Practical Content:

1. Practice on Windows interface and navigating windows
2. Practice on managing files and folders using drives
3. Customize desktop settings and manage user accounts
4. Practice Hard Disk partitioning
5. Study of HDD: Identify various components of HDD and write their functions
6. Print and scan documents using different commands
7. Install necessary application software for windows i.e. office package, PDF reader Media player etc.
8. Install Drivers for printer, scanner, webcam etc.
9. Manage files and folders using basic DOS commands for directory listing
10. Use DOS commands
11. Install and configuration of Microsoft Windows latest OS (Windows 7/8/10)
12. Install Linux with necessary software for Linux
13. Use basic Linux commands

Module No. 4: Number System

Outcome

Perform conversion of different number systems and do arithmetic operation.

Theory Content:

1. Positional number system: Decimal, Binary, Octal and Hexadecimal number system
2. Conversion between these number systems
3. Arithmetic : Addition, subtraction of these numbers, Multiplication and Division for binary system only
4. Negative No. representation : Signed magnitude, 1's complement and 2's complement
5. Subtraction using complements
6. Various binary codes: BCD, EBCDIC ,ASCII , Gray code
7. Fixed and Floating point Nos.

Module No. 5: Boolean Algebra and Logic Gates

Outcome

Simplify Boolean expressions & convert Boolean function to Logic diagram & Vice versa.

Theory Content:

Boolean Algebra and Logic Gates

1. Boolean operations: AND,OR, NOT
2. Proof using identities and truth tables, De Morgan's theorem, Basic principle of Duality
3. Sum of Product (SOP) and Product of Sums(POS), Canonical form
4. Simplification of Boolean Expression using Boolean algebra and K-Map

Logic gates

1. Basic gates: AND,OR,NOT
2. Universal gates: NAND,NOR
3. Conversion of Boolean function to Logic diagram and vice-versa

Practical Content:

1. To study and verify the truth table of NOT ,AND, OR,NAND, NOR gates 6
2. Construct a Logic circuit using basic gates for a given output logic
3. Construct 1's complement & 2's complement circuit and verify
4. Design and implementation using NAND gates -
5. Design Half Adder and Full Adder

Module No. 6: Programming in C

Outcome

Write 'C' Programs using Loop, function, Arrays, Structure, & Pointers.

Theory Content:

Programming in C

1. Introductory concept of programming : Algorithm and Flowchart
2. Introduction to C
3. Character set, Keywords, Constants, Variables, Data Types in C
4. Operators in C
5. Header Files

Statements in C

1. Assignment Statement, Input/ Output statement, Control statement, Loop or Jump control statements
2. Arrays and Strings
3. Functions (User defined and common library functions)
4. Structures of C
5. Basic concept of Pointer

Practical Content:

1. Practice the basic syntax used in C commands, variables – assigning values to C variables (numeric, string etc.)
2. Simple program by assignment and Input/Output statements
3. Program of Flow of Control Structures – If , if-else, switch-case etc

4. Program using Operators- Unary, numeric and logical operators etc.
5. Program using string processing – Length, Converting to all upper or lower case, substring
6. Program using Loop structures – for loop, while loop , do-while loop etc.
7. Program using arrays and string
8. Functions – creating and calling functions, call by value and call by reference, sending parameters to a function, receiving parameters out of a function etc.
9. Program using structure and Union
10. Program using basic concept of pointers

Module No. 7: Introduction to Python

Outcome

Write simple Python program using Python string processing functions and methods, also involving dictionaries & related operations.

Theory Content:

Introduction to Python

1. Getting started with Python
2. Process of writing a simple program (interactive and script mode), running it, and print statement
3. Python fundamentals: Character set, Token & Identifiers, Keywords, Literals, Operators
4. Barebones of a Python program
5. Variables & Assignments
6. Simple input and output
7. Python data types, operators and Expression
8. Introduction to Python standard Library modules
9. Flow of control: if,if-else, if-elif-else statement , Iteration/Looping statements – for loop, while loop, loop else statements, Jump statements
    - **String Manipulation:** String operators, String functions and methods
    - **List manipulation:** Creating and accessing lists, list operators, list functions and methods
    - **Tuples:** Creating and accessing tuples, tuple operations, tuple functions and methods
    - **Dictionaries:** Dictionary-Key: Value Pairs: Creating and accessing dictionary, working with dictionaries, Dictionary functions and methods

Practical Content:

1. Practice the basic syntax used in Python commands, variables – assigning values to Python variables (numeric, string etc.)
2. Working with Simple program by assignment and Input/Output statements
3. Working with Program of Flow of Control Structures – If , if-else, if-elif-else
4. Program using Operators- Unary, numeric and logical operators etc.
5. Program using Python string processing functions and methods
6. Working with Lists : Appending elements to a list, Inserting an element in a list, modifying, elements to a list, deleting an element from a list

7. Working with tuple: Program of creating and accessing tuples, joining and slicing tuples, tuple functions and methods
8. Working with Dictionaries :
9. Multiple ways of creating Dictionaries, inserting, updating and deleting elements from a dictionary, checking for existence of a key
10. Dictionary functions and methods : Get length of the dictionary, accessing items, keys and values , creating dictionaries from keys

Module No. 8: Office Automation Package Word, Excel and Power Point, MS Word

Outcome

Perform basic operations on Word, Excel and Power Point, like creating formatting and Editing etc.

Theory Content:

Office Automation Package Word, Excel and Power Point, MS Word

1. Introduction to the various applications in MS office.
2. Introduction to Word features, Office button, toolbars.
3. Creating, saving and formatting and printing documents using Word.
4. Working with objects, macro, mail merge, templates and other tools in Word

MS Excel

1. Introduction to Excel features and Data Types.
2. Cell referencing and linking Sheets.
3. Introduction to various functions in all categories of Excel.
4. Concepts of sorting, filtering and validating data.
5. Analyzing data using charts, data tables, pivot tables, goal seek and scenarios.

MS Power Point

1. Introduction to Open Office.
2. Introduction to the properties and editing of images.
3. Introduction to different formats of images and their uses.
4. Introduction to Power Point and its advantages.
5. Creating Slide Shows.
6. Fine tuning the presentation and good presentation technique.

Practical Content:

Microsoft Word

1. Open MS Word and familiarize with basic word components.
2. Practice creating, Opening, Resizing, renaming and closing Word document
3. Edit and Save/"Save as" documents
4. Practice Inserting and formatting tables and other objects.
5. Use of Menu bar features
6. Use all standard toolbar features
7. Create document and non-document files
8. Create tables, insert pictures and videos
9. Use of mail merge documents
10. Create bookmark, hyperlinks

Microsoft Excel

1. Open MS Excel and familiarize with basic application components.
2. Practice creating, saving and formatting excel spread sheets.
3. Use absolute and relative referencing, linking sheets, conditional formatting etc.
4. Use absolute and relative referencing, linking sheets, conditional formatting etc.
5. Use various data types in Excel, sorting, filtering and validating data.
6. Create and format various static and dynamic charts.
7. Practice Importing & exporting excel data.
8. Excel for creating worksheets with graphs and visuals

Microsoft PowerPoint

1. Open power point presentation and familiarize with basic application components
2. Create Slide shows, Insert picture and theme.
3. Add new slide, format text, link with word and excel documents.
4. Create slide shows by inserting audio & video and synchronize with presentation.
5. Working with MS Power point for creating multimedia presentation
6. Working with custom animation and effects

Module No. 9: Database Systems

Outcome

Create database files using MS-Access & MySQL and perform different operations on a Database Table using different SQL commands.

Theory Content:

Database Systems

1) Introduction: File-oriented approach and Database-oriented approach
2) Database system Concept: Data Abstraction - Physical, Logical and view level Abstraction, Instances and Schema, Data Independence, Database Languages - DDL, DML, DCL, Various Data Models - ER Model, Hierarchical Model, Network Model, Relational Model, Data Dictionary, Metadata, Database Administrator (Definition and Functions), Database User.
3) Data Modeling: Concept of Entities, Entity sets. Concept of Relations, Attributes, Tuples, Degree, Cardinality. Concept of Relationship and Relationship sets. Concept of Keys - Key, Superkey, Candidate key, Primary key, Alternate key, Foreign key.
4) Introduction to SQL: CREATE TABLE and ALTER TABLE Statements. INSERT, DELETE and UPDATE Commands. Aggregate Functions, DATE and TIME Functions. Simple SELECT Queries (SELECT, FROM , WHERE, DISTINCT, AND< OR, IN, NOT IN, BETWEEN, LIKE, ORDER BY, HAVING, GROUP BY)

Practical Content:

MS-ACCESS

1. Creating a new database with MS-ACCESS
2. Opening existing database
3. Creating table in Data Sheet and design view

4. Enter data and edit data
5. Data validation and verification in Access
6. Develop customized form for data entry
7. Develop queries
8. Generate reports

My SQL

1. Installation of My SQL
2. Create table using SQL
3. Alter Table
4. Insert data in a table using INSERT Command in SQL
5. Viewing data (SQL-SELECT)
6. Updating data in a table (SQL-UPDATE command)
7. Deleting rows of data (DELETE command)
8. Viewing the structure of an already existing table
9. Use of DATE functions
10. Create database design
11. Practice on simple queries using SQL commands

Module No. 10: Computer Networks Introduction to Data Communication & Networking

Outcome

Install & Configure a Network & identify various network media for making LAN, MAN & WAN connection.

Theory Content:

Computer Networks Introduction to Data Communication & Networking

1. Data Communications: Components, Data representation.
2. Basic concepts: Servers, Client, Workstation, Hosts (Definition & Applications).
3. Types of computer networks: LAN, MAN and WAN.
4. Types network architecture: Peer-to-peer, Client-Server and Distributed.
5. Transmission Types: Simplex, Half duplex and Full duplex

Network Topologies and Networking Devices:

1. Type of Topology - Bus Topology; Ring Topology; Star Topology; Mesh
2. Topology; Tree Topology; Hybrid Topology.
3. Network Control Devices -Hubs; Switches; Routers; Bridges; Repeaters; Gateways; Modems.

Transmission Media:

1. Guided Media -Twisted Pair - UTP, STP; Coaxial Cable; Optical Fiber.
2. Advantages of optical fiber and Disadvantages of optical fiber.
3. Un-Guided Media: Wireless Communication- Communication Band;
4. Microwave Communication; Satellite Communication.

Standardization of Network Model

1. Basic idea on OSI Reference Model.
2. Physical layer; Data link layer; Network layer; Transport layer; Session layer; Presentation layer; Application layer.
3. TCP/IP Reference Model.
4. •Comparison of the OSI and TCP/IP reference models.

Multiplexing & Switching :

1. FDM, TDM, WDM, ADM.
2. Circuit Switching: Time division & space division switch, Packet Switching, Message Switching.

IP Addressing:

1. IP Address Assignments;
2. IP Address Classes; Subnet Masking;
3. Registered and unregistered Addresses.

Practical Content:

1. To study the different expansion slots of a motherboard, set the NIC to expansion slot and to install the driver.
2. To locate MAC address of computer and other networking devices.
3. Identify and Compare Network directing devices i.e. Hub, Switch, Router.
4. To study crimping: RJ-45, RJ-11, Cross-over and straight Cable and Create a Network cable using RJ45 connectors.
5. To make a peer-to-peer Network System.
6. Implementing a TCP/IP Network configuring.
7. Create LAN using 10 machines(approx.) and practice
    a) file sharing
    b) internet sharing
    c) printer sharing
8. Create LAN using 10 machines (approx.) and then use suitable subnet mask to create two different sub networks with those machines.
9. To run the following application in a network system and get knowledge: (i) FTP, (ii) Telnet, (iii) mail.
10. To use the ping, tracert, arp, rarp, etc. utility in order to understand its use in a troubleshooting environment.

Module No. 11: The Internet and Cyber Security

Outcome

Access information from Internet using different Web Browser via World Wide Web with the basic knowledge of computer security.

Theory Content:

The Internet and Cyber Security

1. History of Internet
2. Applications of Internet
3. Understanding World Wide Web
4. Web Browsers
5. Search Engine
6. E-mail Service
7. Computer Security
8. Cyber Stalking, Fraud and Abuse

9. Malware
10. Overview of Information Security, SSL, HTTPS, Security threats
11. Introduction to Privacy protection, Audit and Security.
12. Introduction to IT Act and penalties for cyber crimes.

Practical Content:

1. Use of Web Browser and World Wide Web for accessing information
2. Use of Search Engine for information of some topic
3. Creating a new Gmail account
4. Sending and receiving messages
5. Sending attachment with E-mail
6. Creating an account on facebook
7. Protect information, computers and networks from viruses, spyware and other malicious code.
8. Provide firewall security for Internet connection and Network System. (6 Hrs).
9. Protect the computer against various internet threats. (3 Hrs)
10. Make backup copies of important file, data and information. (3 Hrs)
11. Secure your Wi-Fi networks using password

Module No. 12: Web Design Concepts

Outcome

Create Static and Dynamic Web Pages and its related operations using HTML tags.

Theory Content:

Web Design Concepts

1. Concepts of Static and Dynamic Web pages.
2. Introduction to HTML and various tags in HTML.
3. Concepts of different controls used in Web Pages.
4. Concepts of CSS and applying CSS to HTML.
5. Introduction to open source CMS viz, Joomla, Word press etc. and Web authoring tools viz. Kompozer, Front Page etc.
6. Concept of Good Web page designing techniques.

Practical Content:

Designing Static web pages

1. Working with HTML tags, fonts , colors headings
2. Practice with basic HTML elements (e.g. head, title, body), tag and attributes.
3. Design simple web page with text, paragraph and line break using HTML tags.
4. Format text, change background colour and insert pictures in web page.
5. Working with hyperlinks
6. Develop ordered and unordered lists
7. Develop HTML pages using tables, forms, controls etc.
8. Design simple web page with tables and lists.
9. Use marquees, hyperlinks and mail to link in designing web pages.

10. Create frames, add style and design layout.
11. Insert text box, check box and combo box in web page.
12. Design web page using password field, submit button, reset button and radio button etc. (6 Hrs)
13. Design a web page adding flash file, audio and video files.
14. Design web page with forms and form controls using HTML tags.
15. Create web page using Cascading Style Sheet (CSS).

List of Tools, Equipment & materials needed for 30 Trainees:

LIST OF TOOLS & EQUIPMENT			
DESKTOP PUBLISHING OPERATOR (for batch of 30 Candidates)			
S No.	**Name of the Tools and Equipment**	**Specification**	**Quantity**
A. Trainees Tools/ Equipment			
1.	Desktop Computer	Desktop Computer with the computer setup and different types of system Software and application software (C, Python etc.)	20nos. (For Trainee) + 1 no. for Instructor
2.	Laptop	4th Gen Ci5 or higher Processor, 4GB RAM, 1TB Hard Disk, Win8/latest reloaded Licensed OS, 2GB Graphic Card, DVD Writer, Standard ports and connectors.	1 no.
3.	Wi–Fi Router	With wireless connectivity	1 no.
4.	Switch	16 port	1 no.
5.	Structured Cabling in Lab	To enable working with wired networks for practical	As required
6.	Internet Connectivity	Broadband connection with min. 2 mbps speed	As required
7.	Laser Printer	Colour A4 Size	1 no.
8.	Digital Flexographic Printer	Colour	1 no.
9.	Optical Scanner	Flatbed A4	1 no.
10.	Digital Still Camera	High resolution amateur camera	1 no.
11.	Digital Web Cam	High Resolution(3.1 mp or higher)	4 nos.
12.	Micro Phone Cum Head Phone	Wired	5 nos.
13.	External DVD or Blu-Ray Writer	24X or higher external (usb)	2 nos.

14.	LCD Projector	3000 lumens or higher	1 no.
15.	Projector Screen	Matte(antiglare) screen roll type	1 no.
16.	Offline UPS	625 VA or Higher	13 nos.
17.	External Hard Disk	1 TB	1 no.
18.	Network Rack	4U for 24 port	1 no.
19.	Screw Driver Set	Standard	1 set
20.	Mini Dongle for Bluetooth Devices Connection	USB	2 nos.
21.	Patch Panel	24 Port	1 no.
22.	LAN Tester	UTP cat5 cable tester (RJ 45)	1 no.
23.	Binding Machine	Spiral Binding Machine A4 size	1 no.
B. Software (Latest Version)			
24.	MS Office	2010 (professional) or the latest version available at the time of procurement	13 Licenses
25.	Antivirus for – clients/ workstations in profile	Validity of an year or more which should be renewed upon expiry	13Licenses
26.	Adobe Photo Shop	Version CS 6 or the latest version available at the time of procurement	13 Licenses
27.	Regional Language Software	Ileap / Swarna Type Manager/ Any Other Bilingual Software	13 Licenses
28.	Open Office or equivalent	Latest version	Open source software
29.	GIMP / Infra View Image editor or equivalent	Latest version	Open source software
C. List of Other Items/ Furniture			
30.	Vacuum Cleaner	Hand Held, Blower &Sucker	1 no.
31.	Pigeon Hole Cabinet	20 compartments	1 no.
32.	Chair and table for the instructor	With armrest mounted on castor wheels, adjustable height/Standard	01 each(for class room & laboratory)
33.	Dual Desk or Chair and Tables for Trainees	Standard	12/ 24nos.
34.	Computer Table	Laminated top 150X650X750 mm with sliding tray for keyboard and one shelf of storage	13nos.
36.	Operators Chair	Without arms mounted on castor wheels, adjustable height	24nos.
37.	Printer Table	650X500X750 mm can be varied as per local specifications	03nos.
38.	Air Conditioner		As required
39.	Storage Cabinet	60X700X450mm	01no.
40.	White Board	Minimum 4X6 feet	01 no.
41.	Steel Almirah	2.5 m x 1.20 m x 0.5 m	01 no.

D. Raw Materials			
42.	White Board Marker	Assorted colour	As required
43.	Duster Cloth	2'/2'	As required
44.	Cleaning Liquid	500 ml	As required
45.	Photo Copy Paper	A4	As required
46.	Matt Coated Paper	A4, at least 130 GSM	As required
47.	Glossy Paper	A4, at least 130 GSM	As required
48.	Cartridges for Printer	Colour/monochrome as per model of the printer	As required
49.	Stapler	Small	2 pcs.
50.	Stapler	Big	1 pc.
51.	Scissors	Standard Size	5 pcs.
52.	Cello Tape	½" and 1"	As required
53.	Glue Stick	Standard size	6 nos.
54.	Pen drive	16 GB or higher	2 nos.
55.	CDs	52x or higher	50 nos.
56.	DVDs	4.7GB or higher	50 nos.
57.	Wall Clock	Analog	1 no.
58.	Optical Mouse	USB/PS2	As required
59.	Keyboard	USB/PS2	As required
60.	Battery	CMOS Batteries	As required
61.	Chord	3 Pin Power Chord	As required
62.	Battery for LAN tester	9 V	As required
63.	Battery	AA	As required
64.	Battery	AAA	As required