

Subject Name	L	T	P	Credit
Cloud Computer Networking	3	-	-	3

Unit-I

Basics of Network & Networking, Advantages of Networking, Types of Networks, Network Terms- Host, Workstations, Server, Client, Node, Types of Network Architecture- Peer-to-Peer & Client/Server, Workgroup Vs. Domain. Network Topologies, Types of Topologies, Logical and physical topologies, Types of Transmission Media, Communication Modes, Wiring Standards and Cabling- straight through cable, crossover cable, rollover cable, media connectors (Fiber optic, Coaxial, and TP etc.).

Unit-II

Introduction of OSI model, Functions of the seven layers, Introduction of TCP/IP Model, ARP/RARP, Message format, Comparison between OSI model & TCP/IP model. Overview of Ethernet Addresses. Network Devices- NIC, functions of NIC, installing NIC, Hub, Switch, Bridge, Router, Gateways and Other Networking Devices, Repeater, CSU/DSU, and modem, Data Link Layer: Ethernet, Ethernet standards, Ethernet Components, Point-to-Point Protocol (PPP), PPP standards.

Unit-III

Network Layer: Internet Protocol (IP), IP standards, versions, functions, IPv4 addressing, IPv4 address Classes, IPv4 address types, Subnet Mask, Default Gateway, Public & Private IP address, methods of assigning IP address, IPv6 address, types, assignment, Data encapsulation, The IPv4 Datagram Format, The IPv6 Datagram Format, ICMP, IGMP, Introduction to Routing and Switching concepts, Transport Layer: TCP, UDP, Overview of Ports & Sockets. Application Layer: DHCP, DNS, HTTP/HTTPS, FTP, TFTP, SFTP, Telnet, Email: SMTP, POP3/IMAP, NTP etc.

Unit-IV

WAN, WAN Switching, WAN Switching techniques Circuit Switching, Packet Switching etc., Connecting to the Internet : PSTN, ISDN, DSL, CATV, Satellite-Based Services, Last Mile Fiber, Cellular Technologies, Connecting LANs : Leased Lines, SONET/SDH, Packet Switching, Remote Access: Dial-up Remote Access, Virtual Private Networking, SSL VPN, Remote Terminal Emulation,

Unit-V

Network security: Authentication and Authorization, Tunneling and Encryption Protocols, IPSec, SSL and TLS, Firewall, Security Threats. Trouble Shooting Networks: Command Line interface Tools, Using Network Utilities: ping, traceroute, tracert, ipconfig, arp, nslookup, netstat, nbtstat, Hardware Trouble shooting tools, system monitoring tools

Reference Books:

1. CCNA Cisco Certified Network Associate: Study Guide (With CD) 7th Edition (Paperback), Wiley India, 2011
2. "Computer Networks" Andrew & Tanenbaum,
3. W. Richard Stevens, TCP/IP Illustrated Volume-I "The Protocols ", Addison W 2.

Subject Name	L	T	P	Credit
Fundamentals of Storage	3	-	-	3

Unit-I

Introduction to Information Storage : Data, Information, types of data, evolution of storage architecture, core elements of a data center, characteristics of data center, **Data Center Environment:** Application and application virtualization, DBMS, Components of host system, Compute and memory virtualization, Physical components of connectivity, Storage connectivity protocols, **Data Protection RAID :** Implementation methods, array components, techniques, Commonly used RAID levels, RAID impacts on performance, Hot spare, **Intelligent Storage System:** overview, components of ISS, Cache management.

Unit-II

Fibre Channel Storage Area Network (FC SAN): Evolution, Components, interconnectivity options, port types, protocol stack, addressing, WWN addressing, Structure and organization of FC data, Fabric services, Fabric login types, Mesh and core-edge topologies, Benefits of zoning, Types of zoning, Block-level storage virtualization, Virtual SAN, **IP SAN and FCOE:** Drivers for IP SAN, **IP SAN Protocols:** iSCSI and FCIP, Components, topologies, and protocol stack for iSCSI and FCIP, **FCOE:** Drivers, Components of FCOE network, frame mapping, Converged Enhanced Ethernet (CEE).

Unit-III

Network-Attached Storage (NAS): File sharing technology evolution, Benefits of NAS, components, file sharing protocols, I/O operations, implementations, NAS use cases, File-level virtualization, **Object-based and Unified Storage:** Comparison of hierarchical file system and flat address space, Object-based storage model, Key components of object-based storage, storage and retrieval process in object-based storage devices, Content-addressed storage, Unified Storage components, Unified Storage Data access.

Unit-IV

Introduction to Business Continuity: Business continuity, Information availability metrics, terminologies, planning, Business impact analysis, Single points of failure, Multipathing software, **Backup and Archive:** Backup granularity, Backup method, Backup architecture, Backup and recovery operations, Common backup topologies, Backup in NAS environment, Backup to Tape, Backup to Disk, Backup to Virtual Tape, **Deduplication:** overview, methods, implementations, Key benefits, Traditional backup approach, Image-based backup, **Data Archive:** Fixed content, Data archive, Archive solution architecture.

Unit V

Local Replication: Uses of local replica, File system and database consistency ,Local replication technologies, Restore and restart considerations, Mirroring of a virtual volume, Replication of virtual machines, **Remote Replication:** Synchronous and asynchronous replication, Bandwidth requirement ,Host-based, storage array-based, and network-based replication technologies.

References:

1. G. Somasundaram & Alok Shrivastava (EMC Education Services) editors; Information Storage and Management: Storing, Managing, and Protecting Digital Information; Wiley India.
2. Ulf Troppens, Wolfgang Mueller-Friedt, Rainer Erkens, Rainer Wolafka, Nils Haustein; Storage Network explained: Basic and application of fiber channels, SAN, NAS, iSER, INFINIBAND and FCOE, Wiley India.
3. John W. Rittinghouse and James F. Ransome; Cloud Computing : Implementation , Management and Security, CRC Press, Taylor Frances Pub.
4. Nick Antonopoulos, Lee Gillam; Cloud Computing : Principles, System & Application, Springer.
5. Anthony T. Velete, Toby J.Velk, and Robert Eltenpeter, Cloud Computing: A practical Approach, TMH Pub.
6. Saurabh , Cloud Computing : Insight into New Era Infrastructure, Wiley India.
7. Sosinsky, Cloud Computing Bible, Wiley India.

Subject Name	L	T	P	Credit
Object Oriented Programming using C++	3	1	4	6

Unit-I

History of C++, C++ Characteristics, Difference between C & C++, Concept of OOP, Benefits of OOP, Object and classes. Data Types, Variables: Definition, Declaration, Initialization and Scope. Operators, Loops and decision making, Structures and functions: Declaration and Definition.

Unit-II

Overview of Array, Type of Array, Array within a class, Arrays of objects. Pointers: Declaring and Initializing Pointers, this Pointers, Arrays of Pointers, pointers to Object, Pointer to Function. Overview of Constructors and Destructors Parameterized Constructors, Multiple Constructors in a Class.

Unit-III

Overview of Inheritance, Defining Base and Derived Classes, Type of Inheritance, Virtual Base Class, Abstract Class, public and private and protected inheritance, Difference between public, private and protected inheritance.

Unit-IV

Operator overloading, function overloading, Friend functions Virtual functions, Pure virtual function, Polymorphism, Abstract Data Types, abstract base classes. Exception Handling: Overview of Exception handling Mechanism, Exception Hierarchies, Inside an Exception Handler.

Unit-V

C++ I/O system, formatted I/O, creating insertors and extractors, file I/O basis, creating disk files and file manipulations using seekg(), seekp(), tellg() and tellp() functions, Storage Management: Static Memory allocation, Dynamic Memory Allocation: new and delete. Difference between static memory allocation and dynamic memory allocation

Reference Books:

1. Robert Lafore; Object Oriented Programing in C++
2. Ken Barclay; Object Oriented design with C++
3. Balagurusamy; Object Oriented Programing in C++
4. Complete Reference C++

List of Experiments

1. Program to print "Hello".
2. Program to swapping two variables using third variable.
3. Program to check entered alphabet is vowel or consonant.
4. Program to print ASCII value of any alphabet.
5. Program to implement call by value.
6. Program for call by reference.
7. Program to find greatest among three numbers using nested if.
8. Program for factorial using while loop.
9. Program to print reverse of a number using while loop.
10. Program for Fibonacci series.
11. Program for calculator using switch case.
12. Program to pass structure to the function.



13. Program to implement array of structure.
14. Program to implement an array.
15. Program to find maximum and minimum number entered in array.
16. Program for multidimensional array.
17. Program for implementing concept of pointer.
18. Program for demonstrate array of pointer.
19. Program to implement pointer to a function.
20. Program for increment and decrement operation in pointer.
21. Program for arithmetic operations in array.
22. Program to demonstrate constructor and destructor.
23. Program for parameterized overloading constructor.
24. Program for copy constructor.
25. Program to implement concept of inheritance.
26. Program to implement single level, multilevel, multiple, hybrid and hierarchical inheritance.
27. Program for function overloading and operator overloading.
28. Program for access private member of base class using friend function.

Subject Name	L	T	P	Credit
Cloud Computing Applications - I	3	1	4	6

Unit-I

Concept of WWW, Internet and www, HTTP protocol, HTTP Vs HTTPS, Web Browser, Browser architecture, what is client and server? Server-Side v/s Client-Side Scripting.

Web Design: Concepts of effective web design, Web design issues including Browser, Planning and publishing website.

Unit-II

HTML: Introduction to HTML, Basic HTML Tags, Body Tags, Coding Style, Formatting and Fonts, Commenting code, Lists- Unordered, Ordered, Insert Links- Linking to another Document, Internal Links, Email Links, Relative and Absolute Links, Insert Images- Clickable Images, Image Placement and Alignment, Image Size, Image margins, Image Formats, Image Maps- Defining an Image Map, Figure and Figcaption tag. Working with form tag- Basic structure of Form, Form tag Attribute, Difference between Get and Post method, fieldset and legend tag.

Unit-III

HTML: Working with **Table**- Basic structure of Table, Table Attributes, Table Cell Attributes, Table Row Attributes, Table Inside of Tables, Invisible Spacers. **Frame**- Create Windows, Single Window Frames, Creating Column, Creating Row Frames. Meta tags, Overview of **HTML5**- HTML5 tags, features of HTML5.

Unit-IV

Style Sheets: Introduction to CSS, basic syntax and structure using CSS, Type of CSS- Internal, External and Inline CSS, background images, colors, properties of CSS, manipulating texts, Creating borders and boxes, margins, padding using CSS, Create Divs with ID and Class. Overview and features of CSS3- Introduction of media query, Apply CSS in media query.

Bootstrap- Overview of Bootstrap, Create Navigation Bar, Create Slider etc.

Unit-V

JavaScript: Use of JavaScript in webpages, Client side scripting with JavaScript, variables, functions, conditions, loops and repetition, Pop up boxes, Advance JavaScript: JavaScript and objects, JavaScript own objects, the DOM and web browser environments, Manipulation using DOM, forms and validations. Create small website using HTML, Bootstrap and JavaScript.

Reference Books:

1. HTML and Web designing - Kris Jamsa and Konrad King
2. Web Technology - N.P. Goplan, J. Akilandeswari
3. Internet Technology and Web Design - ISRD Group

List of Experiments

1. Create a webpage with HTML describing your department. Use paragraph and list tags.
2. Create links on the words e.g. "Wi-Fi" and "LAN" to link them to Wikipedia pages.

3. Insert an image and create a link such that clicking on image takes user to other page.
4. Change the background color of the page. At the bottom create a link to take user to the top of the page.
5. Create a table to show your class time-table.
6. Use tables to provide layout to your HTML page describing your university infrastructure.
7. Use `` and `<div>` tags to provide a layout to the above page instead of a table layout.
8. Use frames such that page is divided into 3 frames 20% on left to show contents of pages, 60% in center to show body of page, remaining on right to show remarks.
9. Embed Audio and Video into your HTML web page.
10. Apply in-line CSS to change colors of certain text portion, bold, underline and italics certain words in your HTML web page. Also change background color of each Paragraph using in-line CSS.
11. Write all the above styling in CSS in different file (.css) and link it to your webpage such that changes made in CSS file are immediately reflected on the page. Group Paragraphs into single class and add styling information to the class in CSS.
12. Create a simple form to submit user input like his name, age, address and favorite subject, movie and singer.
13. Add form elements such as radio buttons, check boxes and password field. Add a submit button.
14. Design a webpage in bootstrap for shopping website.
15. Make a navigation bar in bootstrap.
16. Make an image slider in bootstrap.
17. Create a form in HTML and put validation checks on values entered by the user using JavaScript (such as age should be a value between 1 and 150).
18. Write a JavaScript program to display information box as soon as page loads.
19. Write a JavaScript program to change background color after 5 seconds of page load.
20. Write a JavaScript program to dynamically bold, italic and underline words and phrases based on user actions.
21. Write a JavaScript program to display a hidden div.
22. Using ideas from the above experiments, try to create a website for your department.
23. Create an e-book having left side of the page name of the chapters and right side of the page the contents of the chapters clicked on left side.

Subject Name	L	T	P	Credit
Server Operating System - I	-	-	8	4

Practical List

- Installing windows server 2012
- Disk Management – MBR, GPT, VHD, Basic disk, Dynamic disk, storage pool, disk pool
- NTFS file system and its features – file permissions, quota, VSS, offline files
- IPv4 and IPv6
- DHCP – Deployment and configuration
- DNS – Forward and reverse lookup, primary/secondary/stub zone, forwarders, root hints, caching only DNS, Dynamic DNS.
- Installing Active Directory domain controllers
- Active Directory user, group, OU management
- Create and manage Group Policy objects (GPOs)
- Configure security policies
- Configure application restriction policies
- Configure Windows Firewall
- Deploy and manage Windows Deployment Services (WDS)
- Install and configure Windows Server Update Service (WSUS)
- Configure DCS to monitor servers, VMs, networking, real time performance
- Configure Distributed File system (DFS)
- Configure File Server Resource Manager (FSRM)
- Configure file and disk encryption Page 3 Paper Topic
- Configure routing
- Configure NAT
- Configure VPN
- Configure RADIUS servers
- Configure Network Access Protection
- FSMO roles
- Active Directory backup and restoration
- Active directory task delegation
- Active Directory object and container level recovery
- Advance Group Policy Object configuration and management