

| Subject Name | L | T | P | Credit |
|----------------|---|---|---|--------|
| Web Technology | 3 | 1 | 4 | 6 |

Course Objectives:

- Basic concepts of Web and learn to design effective web pages.
- Learn to apply basic and advanced tags of HTML.
- Learn to apply HTML5 tags.
- Students will learn the basic CSS concepts: selectors, CSS properties, CSS code structure, CSS declarations, CSS unit types etc.
- Learn to apply JavaScript and PHP.

Unit-I

Introduction to Internet Technology: History of the internet, internetworking concepts, architecture, and protocol: TCP/IP and others main protocols, internet address and domains. World Wide Web (WWW), Web Clients, Web Servers, Hyper Text Transfer Protocol (Http), feature of HTTP protocol, HTTP request response model, Hyper Text Transfer Protocol Secure (HTTPS), proxy server, Firewall.

Unit-II

Static Web page Development: Introduction to Hyper Text Markup Language (HTML), Elements of HTML, Basic structure of an HTML, document Head & Body Sections, inserting texts, Text alignment, using images in pages, Hyperlinks text, Forms in HTML, Backgrounds and Color controls, creating and using Tables in HTML, Creating Lists: Ordered List Tags, Unordered List Tag. Changing the Font Color; Marquee Tag.

Unit-III

Dynamic Web page Development: Cascading Style Sheet: CSS, Defining Style with HTML Tags, Features of Style Sheet, Style Properties, CSS Styling (Background, Text Format, Controlling Fonts), Working with Lists and Tables, Style placement: Inline style, Span & div tags, header styles.CSS Id and Class Working with block elements and objects, CSS Color.

Unit-IV

JavaScript Overview: JavaScript and the WWW, Script, element, Functions: Functions introduction, calling functions, JavaScript Comments, Variables: Variables overview, declaring variables, Types of variables, Casting variables, Alert box, Prompt & confirm. Expressions: Arithmetic operators, Assignment operators, Logical operators, Expressions and precedence, Statements: If statement; for statement, while statement, Break/Continue.

Unit-V

Introduction to PHP: PHP data types, Variable, Constants, Variable scope, Operators, If, else if, switch statement, loops: while, do while, for, foreach, breaking out of loops: Break, Continue, and exit. **Working with Form:** GET and POST data, Combine HTML and PHP code, create user Forms using database.

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

Course Outcomes:

- Students will learn the basic concepts of HTML, structure of a web page.
- Students will understand directory structures and how they impact html code and client and server computers interact.
- Students will learn CSS Tag selectors – how CSS code is used to target HTML tags, text and other elements in an HTML page.
- Students will learn CSS menu/navbar creation techniques. Students will learn JavaScript event handlers.
- Student will learn basics of PHP and database connectivity.

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 portions, bold, underline and italics certain words in your HTML web page. Also change the background color of each Paragraph using in-line CSS.
11. Write all the above styling in CSS in different files (.css) and link it to your webpage such that changes made in CSS file are immediately reflected on the page.

Group Paragraphs into a 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 fields. Add a submit button.
14. Design a web page in bootstrap for shopping websites.
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 an 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 the left side of the page name of the chapters and right side of the page the contents of the chapters clicked on the left side.
24. Create login and form and connect it with database.

| Subject Name | L | T | P | Credits |
|-------------------------|---|---|---|---------|
| Fundamentals of Storage | 3 | - | - | 3 |

Course Objectives:

- Introduced with advanced computing like cloud computing, data storage has also undergone many transformations in terms of techniques and hardware used for the same.
- Learn different aspects of data storage.
- Learn fundamentals of data storage, covering topics like demands on data, how storage techniques have evolved over a period of time and vital information about storage topologies like DAS, NAS and SAN, along with their comparison features.
- Get knowledge about the different hardware required for storage like adapters, connectors, cables and their individual features.
- Learn about different storage protocols used like ATA, SATA, SPI and its sub-categories will be taught to students in the following units.

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, 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 0, RAID 1, RAID 5, RAID 6, RAID 10) 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, 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, 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, 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, **Backup and Archive:** Backup granularity, Backup method, Backup architecture, Backup and recovery

operations, **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.

Course Outcomes:

- Understand knowledge of data storage techniques using various storage topologies and their comparisons.
- Provide students to choose the best suitable data storage method for their programs and applications.
- Be trained in different storage protocols.
- Gain in knowledge in different hardware required for storage.
- Be able to understand the fundamentals of data storage.

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

Course Objectives:

- To learn basic concepts of object oriented programming.
- To learn dynamic memory management and constructors and destructors.
- To learn inheritance and its types.
- To understand data hiding, operator and function overloading.
- To understand about file handling and its functions.

Unit I

History of C++, C++ Characteristics, Difference between C and C++, Basic Structure of a C++ program, Compiling and Executing C++ Program. Selection control statements in C++. Data types, Expression and control statements Iteration statements in C++, Introduction to Arrays, Multidimensional Arrays, Strings and String related Library Functions.

Unit II

Functions, Passing Data to Functions, Scope and Visibility of variables in Functions, Structures in C++. Creating classes and Abstraction: Classes objects, data members, member functions, this Pointer, Friends, Friend Functions, Friend Classes, Friend Scope, and Static Functions.

Unit III

Constructors and Destructors, Static variables and Functions in class. Operator Overloading in C++, Overloading Unary Operators, Overloading binary operators.

Unit IV

Inheritance in C++, Types of Inheritance, Pointers, Objects and Pointers, Multiple Inheritance, Virtual Functions, Polymorphism, Abstract classes.

Unit-V

C++ I/O system, formatted I/O, file I/O basics, 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 Programming in C++
2. Ken Barclay; Object Oriented design with C++
3. Balagurusamy; Object Oriented Programming in C++
4. Complete Reference C++

Course Outcomes:

- Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.

- Understand dynamic memory management techniques using pointers, constructors, destructors, etc
- Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.
- Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.
- Demonstrate the use of file handling techniques.

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 |
|----------------------------------|---|---|---|--------|
| System Security and Cryptography | 3 | - | - | 3 |

Course Objectives:

1. To provide a deeper understanding of cryptography, its application to network security, threats/vulnerabilities to networks, and countermeasures.
2. To explain various approaches to Encryption techniques, strengths of Traffic Confidentiality, and Message Authentication Codes.
3. To familiarize Digital Signature Standard and provide solutions for their issues.
4. To familiarize with cryptographic techniques for secure (confidential) communication of two parties over an insecure (public) channel; verification of the authenticity of the source of a message.

Unit - I

Introduction to cryptography, Classical Cryptosystem, Block Cipher. Data Encryption Standard (DES), Triple DES, Modes of Operation, Stream Cipher. LFSR-based Stream Cipher.

Unit - II

Mathematical background, Abstract algebra, Number Theory. Modular Inverse, Extended Euclid Algorithm, Fermats Little Theorem, Euler Phi-Function, Eulers theorem. Advanced Encryption Standard (AES),

Unit - III

Introduction to Public Key Cryptosystem, Diffie-Hellman Key Exchange Primarily Testing, ElGamal Cryptosystem, Elliptic Curve over the Reals, Elliptic curve Modulo a Prime.

Unit - IV

Generalized ElGamal Public Key Cryptosystem, Rabin Cryptosystem. Message Authentication, Digital Signature, Key Management, Key Exchange, Hash Function. Cryptographic Hash Function, Secure Hash Algorithm (SHA), Digital Signature Standard (DSS).

Unit - V

Cryptanalysis, Time-Memory Trade-off Attack, Differential and Linear Cryptanalysis. Cryptanalysis on Stream Cipher, Modern Stream Ciphers, Shamirs secret sharing and BE, Identity-based Encryption (IBE) Side-channel attack, The Secure Sockets Layer (SSL), Pretty Good Privacy (PGP), Introduction to Quantum Cryptography.

Reference Books:

1. William Stallings (2006), Cryptography and Network Security: Principles and Practice, 4th edition, Pearson Education, India.
2. edition, Pearson Education, India.

3. William Stallings (2000), Network Security Essentials (Applications and Standards), Pearson Education, India.
4. Charlie Kaufman (2002), Network Security: Private Communication in a Public World, 2nd edition, Prentice Hall of India, New Delhi.
5. Atul Kahate (2008), Cryptography and Network Security, 2nd edition, Tata McGrawhill, India.
6. Robert Bragg, Mark Rhodes (2004), Network Security: The complete reference, Tata McGrawhill, India.

Course Outcomes:

At the end of this course students will be able to:

1. Identify basic security attacks and services
2. Use symmetric and asymmetric key algorithms for cryptography
3. Design a security solution for a given application
4. Analyze Key Management techniques and importance of number Theory.
5. Understanding of Authentication functions the manner in which Message Authentication Codes and Hash Functions works.
6. To examine the issues and structure of Authentication Service and Electronic Mail Security

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

Course Objectives

- Provide knowledge about Windows Server 2012 R2.
- Students will be familiar in Windows user experience that helps you manage users and safeguard business information.
- Student explores the method to install, upgrade, and deploy the Windows Server.
- Students will have the functional knowledge of configuring core network services and the active directory of Windows Server.

List of Experiments:

- 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 Distributed File system (DFS)
- Configure File Server Resource Manager (FSRM)
- Configure file and disk encryption
- Configure routing
- Configure NAT
- Configure VPN

- Configure RADIUS servers
- Configure Network Access Protection
- FSMO roles
- Active Directory backup and restoration

Course Outcomes:

- Acquire knowledge and skills needed to install and configure windows server 2012 and configure local storage and other services like file sharing and print sharing.
- Configuring different types of servers.
- Making active directory.
- Windows Server 2012 administration.