Semester-I					
course code	**Title of the paper**	**External Credits**	**Internal Credits**	**Total Credits**	**Total No of Classes**
SE-101	Programming with C++	3	1	4	40hrs
SE-102	PHP And MySQL	3	1	4	40hrs
SE-103	Linux Operating Sytem & Administration	3	1	4	40hrs
SE-104	Client Server Technology	3	1	4	40hrs
SE-105	Lab-1 (C++ + PHP)	1	1	2	60hrs
SE-106	Lab-2 (Linux + CST)	1	1	2	60hrs
Total Credits		**14**	**6**	**20**	280hrs

Semester-II					
course code	**Title of the paper**	**External Credits**	**Internal Credits**	**Total Credits**	**Total No of Classes**
SE-201	Visual Basic.NET	3	1	4	40hrs
SE-202	Windows Programming Using VC++	3	1	4	40hrs
SE-203	Software Engineering	3	1	4	
SE-204	Data Structures using C++	3	1	4	40hrs
SE-205	**Elective-II** 1.Computer System Security 2.Network Security 3. Network Programming	3	1	4	40hrs
SE-206	Lab-3(VB.Net+VC++)	1	1	2	60hrs
SE-207	Lab-4(DS)	1	1	2	60hrs
SE-208	Seminar	1	0	1	40hrs
Total Credits		**18**	**7**	**25**	360hrs

M.Sc.SE-101 Programming with C++ 4 Credit

UNIT I: Introduction to OOP's

Procedure Oriented Programming, Object oriented programming, Basic concept of OOP's, Benefits of OOP's.

UNIT II: Introduction to C++

Tokens, keywords, Identifiers and constants, Basic data types, Operators in c++ , Operator precedence and associativity, Structure of C++ programming, Type casting Control Structure, Sequential, Branching, Looping

UNIT III: Functions in C++

Function, Function prototype, Call by reference, Return by reference, Inline function, Default arguments, Function overloading

UNIT IV: Classes and objects

Specifying a class and object, Nesting of member function, Memory allocation for objects Static data member and static member function, Friend functions, friend class Nested class and Local Class, Passing objects to functions, Returning object, Constructor, Types of constructor, Default constructor, Parameterized constructor, Copy constructor, Dynamic constructor, Destructor, Overloading constructors, Concept of operator overloading, Unary and binary operator overloading. Operator Overloading using friend function, Overloading Special Operators Overloading [ ] , Overloading ( ), Overloading

UNIT V: Inheritance and Polymorphism

Concept of inheritance, Types of inheritance, Virtual base classes, Pointer to derived class, Pointer to object, Polymorphism, Virtual functions, Rules for virtual functions, Pure virtual functions, abstract class Console I/O operations, Formatted and Unformatted I/O Operations. C++ classes for console I/O , C++ stream classes for file I/O Opening and Closing a file , Sequential and Random access file. Error handling during file operations, Command line arguments.

UNIT VI: Templates and Exception handling

Class Templates, Function templates, Basics Exception Handling, Exception handling mechanism. Throwing, catching, returning mechanism, manipulating String and STL

Introduction. Creating string objects, manipulating string objects, Relational operations, Introduction to STL

Reference Books :-

1. The C++ Complete Reference, IV Edition, Herbert Schildt, McGraw Hill Publication, 2002, ISBN 0071502394, 9780071502399.
2. Object-Oriented Programming with C++, VI Edition, E Balgurusamy, McGraw Hill, 2013, ISBN 125902993X, 9781259029936.

3. Let us C++, Edition Illustrated, Yashavant P. Kanetkar, BPB Publications, 1999, ISBN 8176561061, 9788176561068.

Practical List

1. Program Of user defined data type (e-num, Struct).
2. Program of scope resolution Operator
3. Program of type cast and symbolic constant
4. Program of call by value and return by reference
5. Program of Inline function.
6. Program of function overloading
7. Program of class and object
8. Program of Array within class.
9. Program of friend function.
10. Program of static data member and Static member function
11. Program of constructors and Destructors
12. Program of types of inheritance
13. Program of virtual base class and local class
14. Program of virtual function and Pure virtual function

M.Sc.SE-102 PHP & MySQL 4 Credit

UNIT I: Introduction to PHP

Basic Syntax, Sending Data to the Web Browser, Understanding PHP and HTML and White Space, Writing Comments, What Are Variables? , About Numbers, About Strings, About Constants, Operators, What Are Arrays, Conditionals statements, looping statements.

UNIT II: Creating Dynamic Web Sites

Creating an HTML Form, Handling an HTML Form, Validating Form Data, Handling HTML Forms with PHP Redux, Making Sticky Forms, Including Multiple File, Creating and Calling Your Own Functions, Variable Scope, Date and Time Functions,
Sending Email

UNIT III: Introduction and Advanced SQL and MySQL

Choosing Your Column Types, Choosing Other Column Properties, Creating Databases and Tables, Inserting Records, Selecting Data, Using Conditionals, Using LIKE and NOT LIKE, Sorting Query Results, Limiting Query Results, Updating Data, Deleting Data, Using Functions, Database Design, Performing Joins, Grouping ,Creating Indexes, Using Different Table Types, Performing FULLTEXT Searches,
Database Optimization

UNIT IV: Error Handling and Debugging

General Error Types and Debugging, Displaying PHP Errors, Adjusting Error Reporting in PHP, Creating Custom Error Handlers, Logging PHP Errors, Debugging Techniques, SQL and MySQL Debugging Techniques

UNIT V: Using PHP with MySQL

Modifying the Template, Connecting to MySQL and Selecting the Database, Executing Simple Queries, Retrieving Query Results, Ensuring Secure SQL, Counting Returned Records, Updating Records with PHP

UNIT VI: Web Application Security

Using Cookies, Using Sessions, Sessions and Cookies, Improving Session Security, More Secure Form Validation, Handling HTML, Validating Data by Type, Form Validation with JavaScript

References

1. PHP and MySQL for Dynamic Web Sites: Visual Quickpro Guide, Second Edition, Larry Edward Ullman, Peachpit Press, 2003, ISBN 0321186486, 9780321186485.
2. Programming PHP, II Edition, "Rasmus Lerdorf, Kevin Tatroe, Peter MacIntyre", "O'Reilly Media, Inc.", 2013, ISBN 1449365833, 9781449365837

Practical's : 20 Practical's Based on the above Syllabus

M.Sc.SE-103 Linux Operating System & Administration 4 Credit

UNIT I Introduction & Working with RED Hat Linux

Advantages of Linux, other Linux distributions, Red Hat Linux installation, concept of linux loader, hardware requirements, linux file system, shells, text editors, changing user information, file permissions, virtual consoles

UNIT II The X Window System

Basic X window system, configuring X window system, starting X, selecting & using X window

UNIT III Managing Services

Linux Boot Process, system services and run levels, controlling services at boot with administrative tools, starting and stopping services manually

UNIT IV Managing Software & System Resources

Using RPM for software management, using RPM on the command line, extracting a single file from & RPM file, graphical package management, system monitoring tools

UNIT V Printing with Linux

Configuring & managing print services, local printer installation, network printer installation, linux printing commands, using the Common UNIX Printing System (CUPS), console print control

UNIT VI Introduction to Networking Concepts, DNS & Apache WEB Server

Networking with TCP/IP, hardware devices for networking, using RED HAT Linux network configuration tools, using DHCP [Dynamic Host Configuration Protocol], using the network file system, wireless networking, introduction to DNS, essential DNS concepts, configuring namespaces with DNS, about the Apache web server, installation of Apache web server

Reference Books

1. Red Hat Linux Unleashed, Edition illustrated reprint, “Bill Ball, David Pitts”, Sams, 2001, ISBN 0672319853, 9780672319853.
2. Red Hat Fedora 2 Unleashed, Edition illustrated, “Bill Ball, David Pitts”, Sams, 2005, ISBN 067232721X, 9780672327216.

M.Sc.SE-104 Client Server Technology 4 Credit

UNIT I: Introduction to Networks and Networking Concepts

What is networking?, A Networking Lexicon, Network Types.

UNIT II: Network Design Essentials

Network Design, Designing a Network Layout, Standard Topologies, Hubs, Switches Variations of Major Topologies.

UNIT III: Networking Media

Primary Cable Types, Wireless Networking: Intangible Media

UNIT IV: Network Interface Cards

Network Interface Cards Basics, Special Purpose NIC's, Driver Software

UNIT V: Network Communications and Protocols

OSI Reference Model and 802 Networking Models, Function of Packets in Network Communications Protocols, Channel Access Methods, Putting data on cables: Access Methods.

UNIT VI: Network Architecture

Ethernet Technology, Token Ring Architecture, AppleTalk and ARCnet, FDDI Network Technology, Other Networking Alternatives

References:

1. Guide to Networking Essentials, Second Edition, "Ed Tittle, David Johnson", Cengage Learning, 2011, ISBN 1111312524, 9781111312527.
2. Computer Networking, Edition, 5, illustrated, "Andrew S. Tanenbaum, David Wetherall", Pearson Prentice Hall, 2011, ISBN 0132126958, 9780132126953

M.Sc.SE-201 Visual Basic.NET 4 Credit

UNIT I: Introduction to .Net & IDE Components

What is .Net, The Overview of .Net Framework, The Common Language Runtime, The .Net class Framework, User & Program Interface, Visual Studio.Net startup, Visual Studio.Net, Solution Explorer, Namespace, Code Window, Customizing the text Editor, Extended IntelliSense, Properties Windows, Dynamic Help, Useful Features of VS.NET

UNIT II: Variable, Control Statement, Function, Form & Controls

Variable, Arrays, Flow Control Statement, Subroutines & Function, Arguments Passing Mechanism & Event Handler Arguments, Passing an unknown number of arguments & Named arguments, The Appearance of Forms, Designing Menus, Building Dynamic Form at runtime, TextBox Control, The List Box, CheckedListBox & ComboBox Controls, The Common Dialog Controls, The RichTextBox Control, TreeView & ListView Control

UNIT III: Custom Classes & Controls, Strings, Characters & Dates

Creating Classes & Objects, Inheritance, Polymorphism, MyBase & MyClass, Building Custom Controls, Using Customs Controls in others classes, The Char class, The String class, StringBuilder class, DateTime Class

UNIT IV: Working with Folders & Files

Directory class, File class, DirectoryInfo class, FileInfo class, Path class, File Stream class, Stream Writer class, Stream Reader, Binary Writer & Binary Reader class, File System Watcher Components

UNIT V: Error Handling & MDI Applications

Types Of Errors, Exception & Structured Exception Handling, Debugging, MDI Application, Building MDI Application, Accessing Child Forms

UNIT VI Building Database Applications with ADO.NET

The Architecture of ADO.NET, Creating a Dataset, Data Binding, DataAdapter objects, The Command & DataReader Objects, Structure of DataSet, The DataForm Wizards, Creating & Displaying Crystal Reports

References

1. Mastering Visual basic .Net, Edition II, Evangelos Petroutsos, John Wiley & Sons, 2006 ,ISBN, 0782152341, 9780782152340.
2. Professional VB.Net 2003 Edition 3, illustrated ,"Bill Evjen, Bills Hollis", Wiley, 2004, ISBN 0764559923, 9780764559921.

3. Visual Basic.Net Programming Black Book, New Edition, Steven Holzner, Dreamtech Press, 2007, ISBN 8177226096, 9788177226096

M.Sc.SE-202 Windows Programming Using VC++ 4 Credit

UNIT I: Introduction

Windows Programming Model, Windows Programming SDK Style, Benefits of MFC & C++, Design goals of MFC, MFC Outline, MFC Frameworks and your Application, MFC Application, Message Map, Message Map Category, Message Map Ranges, Timer Message, User defined windows message

UNIT II: User Interface Controls, Menus & Dialogs

Buttons**,** Static and Edit control**,** List and Combo boxes**,** Scroll bar controls**,** CBitmapButton control**,** Menus**,** Dialogs**,** Model Dialogs, Modeless Dialogs**,** Application requirement and design**,** Modeless and dialog manipulation**,** Setting dialog color**,** Creating modeless dialogs**,** Dialog initialization**,** Shortcut menu**,** System menu**,** CToolBar, CStatusBar, CDialogBar class**,** CFileDialog**,** CColorDialog**,** CFont Dialog**,** Customizing common dialogs

UNIT III: Device Context and Drawing

CDC Class, CPaint Class, CColorDC, CWindowDC, CMetaFileDC, Drawing with Pen and Brush, Drawing with mouse, Windows enhanced metafiles **MFC Collection Class,** List classes**,** Array classes**,** Serialization and dumping

UNIT IV: Using AppWizard and ClassWizard

Dialog based application framework, Modifying the framework, Dialog data exchange and validation, Win32 console application, Creating a console in your in your windows program, Creating a static library, Visual C++ project file type **MFC Documents and Views,** Components of Document view system**,** An SDI Application**,** An MDI application **Testing Debugging and Error Handling**, Debug Vs Release build, MFC and C++ exception C++ and MFC assertion, Dumping and Tracking, Tracking Memory

UNIT V: Implementing Context Sensitive Help

Message Map support Help, Modify the help text, editing the RTF File, Identifying and preparing the topics, Extending the Help System, **MFC Support Printing**, AppWizard support for printing and print preview, Implementing printing and print preview, Pagination

UNIT VI: Dynamic Linking Library – An Introduction, DLL Export Vs Client Import**,** Implicit linkage Vs Explicit linkage**,** DLL Entry Point**,** MFC Vs non-MFC DLL**, Advance Interface Concepts,** Splitter, Window and terminology, Static splitter –an Example, An, Example of a dynamic splitter, Splash screen, **MFC Database Support**, SQL Creating and restricting a data source, MFC support for ODBC, A simple application, **Windows Threads,** A

worker thread example, Using interface threads, Thread synchronization, Thread priorities, **Introduction to COM**, An example, Testing the Server, Active Template Library

Reference Books:

1. **Programming Windows with MFC, Second Edition ,**Jeff Prosis, **TMH** Microsoft Press; 2nd ed. edition (May 13, 1999) **SBN-10:** 1572316950 **ISBN-13:** 978-1572316959
2. Windows Programming using MFC, Edition I, Suraj Rath, BPB Publication
3. Programming in Visual C++, Edition I, Yeshwant P.Kanetkar, PBP Publication, 2004.ISBN 8170299713, 9788170299714.
1. **Programming in visual C++ Complete Reference**

Practical Assignments:-

Practical work consists of at least 15 Programs on above topics.

M.Sc.SE-203 Software Engineering 4 Credit

UNIT I: Introduction to Software Engineering
The Evolving Role of Software, Software Characteristics, Categories of Computer Software, The Software Myths.

UNIT II: The process
Software Engineering – A layered Technology, A Process Framework, The capability Maturity Model Integration (CMMI), Process Patterns ,Process Assessment, The Waterfall Model, Prototyping Model, Spiral Model, Fourth generation techniques.

UNIT III: Requirements Engineering
Requirements Engineering, Initiating the Requirements Engineering Process, Eliciting Requirements, Negotiating Requirements, Validating Requirements

UNIT IV: Design Engineering and Web Engineering
Design Process and Design Quality, Design Concepts, The Design Model, Pattern- Based Software Design, Attributes of Web Based Systems and Applications, Web App Engineering Layers, The Web Engineering Process, Web Engineering Best Practices

UNIT V: Testing Strategies
A Strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Validation Testing, System Testing, Debugging, White Box Testing, Black Box Testing, Control Structure Testing.

UNIT VI: Metrics for Process, Projects and Estimation
Software Measurement, Metrics for Software Quality, Software Project Estimation, Decomposition Techniques, Empirical Estimation Models

Reference Books:
1. Software Engineering –A Practitioner's approach, Sixth Edition, Roger S. Pressman, McGraw-Hill Higher Education; (1 August 2007), **ISBN-10:** 0077227808

1. Software Engineering –A Practitioner's approach, Fifth Edition, Roger S. Pressman, McGraw-Hill Higher Education; (1 August 2005)

M.Sc.SE-204 Data Structure Using C++ 4 Credit

UNIT I: Stack and Recursion

Definition and example of Stack, Representing stack in C++ , Infix, postfix, and prefix ,Definition and process of Recursion, Properties of recursive definitions or Algorithms , Implementation of recursion in C++, The tower of Hanoi problem , Translation from prefix to Postfix using recursion, simulating recursion

UNIT II: Queues and Lists

Queues and its sequential representation, Operation on Queues, Types of Queues, Linked list, Operations on linked list, Simulation using linked lists.

UNIT III: Trees

Binary tree and its representation, The Huffman algorithm, representing lists as binary trees, constructing a tree, Operations on Trees.

UNIT IV: Sorting and Searching

General background, Exchange sorting , Bubble sort , Quick sort , selection sort and Tree sorting , Binary tree sorting , Heap sorting ,
Insertion sort, Merge and Radix sort, Basic searching techniques , Sequential searching , Indexed Sequential searching , Binary searching , Interpolation Searching , tree searching , Inserting into a binary search, Deleting from a binary search , Optimum search tree,
Multiway search tree, implementing a multiway tree

UNIT V: Hashing

Resolving Hash clashes by open addressing , Deleting items from Hash table , hash table reordering, Brent's method , Binary tree hashing , Dynamic hashing and extendible hashing, Linear hashing, Choosing a hash function,.

UNIT VI: Graphs

Representation of graph in C++, Transitive Closure, Shortest path algorithm, A flow problem.

Ref. Books:-

1. Data structures using C and C++, Second edition, By Y. Langsam, Augenstein and Tenenbaum, PHI publication
2. Algorithms in C++ Second Edition, By Robert Sedge wick Addis on – Wesley Publishing Company

Practical Lists:

1. Implementing Stack using C++
2. Program to evaluate postfix expression
3. Program to convert expression from infix to postfix
4. Program to demonstrate translation from prefix to postfix using recursion.
5. Implementation of Queue using C++
6. Array implementation of a priority queue
7. Implement Linked List using C++
8. Program for linked implementation of stacks
9. Implementing getnode and freenode operations in linked list
10. Implementation of header node in linked list
11. Implement node representation of binary tree
12. Implement threaded binary tree
13. Implementation of Huffman algorithm
14. Implement Bubble Sort
15. Implement Quick Sort
16. Implement Heap Sort
17. Implement Binary tree Sort
18. Implement Merge and Radix Sort
19. Implement Hash Table with all operations
20. Implement shortest path algorithm

M.Sc.SE-205 Elective II (1) Computer System Security 4 Credit

UNIT I: Introduction

Notion of different types of securities: Information Security.

Computer Security: Security Goals, Relation between Security-Confidentiality, Integrity, Availability and Authorization, Vulnerabilities- Principles of Adequate protection. Operating security, Database security, Program security, Network Security (Notions Only). **Attacks:** Threats, Vulnerabilities and controls. The kind of problems-Interception, Interruption, Modification, Fabrication. **Computer Criminals:** Amateurs, Crackers, Career Criminals. Methods of Defense: Control, Hardware Controls, Software Controls, Effectiveness of Controls. **Program Security:** Secure programs: Fixing Faults, Unexpected Behaviour, Types of Flaws. **Nonmalicious program errors:** Buffer overflows, Incomplete Mediation. Viruses and other **Malicious code:** Why worry about Malicious Code, Kinds of malicious code, How viruses attach, How viruses gain control, Prevention, **Control Example:** The Brain virus, The Internet Worm, Web bugs. **Targeted malicious code**: Trapdoors, Salami Attack. **Controls against program threats:** Development Controls, Peer reviews, Hazard Analysis.

UNIT II: Operating System Security

Protected objects and methods of protection

Memory address protection: Fence, Relocation, Base/Bounds Registers, Tagged Architecture, Segmentation, Paging. **Control of access to general objects:** Directory, Access Control List. **File protection mechanism**: Basics forms of Protection, Single Permissions. **Authentication:** Authentication basics, Password, Authentication Process Challenge-response, Biometrics. **Trusted Operating systems**: Security Policies for Operating Systems, **Models of Security**: Requirement of security systems, Multilevel Security, Access Security, Limitations of Security Systems. ***Trusted Operating System Design***: Elements, security features, assurance, system flaws and assurance methods.

UNIT III: Database Security

Security requirements- Integrity of Database, Confidentiality and Availability, Reliability and integrity, Sensitive data, Interface, Multilevel database, Proposals for multilevel security

UNIT IV: Administrating Security:

Security planning: Contents of a security , Planning Team members, commitment to a security plan, Business continuity Plans. **Risk analysis**: The nature of risk, steps of risk analysis. Arguments for and against risk analysis, **Organizational security policies**: Purpose and goals of Organizational Security. Audience, Characteristics of a Good Security Policy. **Nature of**

security Policies: Data sensitivity policy, Government Agency IT security policy. **Physical security**: Natural Disaster, Human Vandals, Interception of Sensitive Information **Legal, Privacy, and Ethical Issues in Computer Security:** Protecting programs and data, Information and law, Rights of employees and employers, Software failures, Computer crime, Privacy, Ethical issues in computer society, Case studies of ethics

Text Books:

1. *Security in Computing* , Second Edition, C. P. Pfleeger, and S. L. Pfleeger, Pearson Education.
2. *Computer Security: Art and Science*, Second Edition, Matt Bishop, Pearson Education
3. *Cryptography And Network Security: Principles and practice First Edition*, .Stallings**,**

M.Sc.SE-205 Elective II (2) Network Security 4 Credit

UNIT I: Security in Network: Model for Security

Threats in Networks, Stealing Passwords, Social Engineering, Bugs and Backdoors, Authentication Failures, Protocol Failure, Information Leakage.

Elementary Cryptography: Terminology and Background, Cryptography and network security. Concepts of Encryption and Decryption. Cryptanalysis, Substation Cipher. Transpositions Good and Secure Encryption Algorithm, Trust worthy Encryption systems Data encryption standards (DES) and Advanced Encryption Standards (AES) Comparison of DES and AES.

Classical Encryption Technique: Symmetric and Asymmetric Encryption Systems, Stream and Block Ciphers, Contemporary Symmetric Ciphers, Confidentiality using Symmetric Encryption.

Public Key Encryption and HASH Functions: Public Key Cryptography and RSA, Message Authentication and Hash Function, Hash Algorithms, Digital Signatures and Authentication Protocols.

UNIT II: Firewalls

Basic Concepts (for understanding the firewalls rules): TCP Segment format IP Datagram format. **Introduction:** Kinds of Firewalls, Packet Filters. Packet Filtering. Dynamic Packet Filters. Application-Level Filtering, Circuit-Level Gateways, Firewall Configurations, Demilitarized Zone (DMZ), Networks, Distributed Firewalls, Limitation of Firewalls.

Filtering Services: Reasonable Services to Filter (Filter Rules to be applied): DNS, Web, FTP, NTP.

DNS (Domain Name Server): DNS overview, Protocol overview, Hierarchal Structure, Root Servers, Practical Experience.

DNS Security: Unpatched Servers, Misconfigured Servers.

DNS Cache Poisoning: Denial of Service Attack. Distributed Denial of Service Attack. Luring Users into a Crafted Site

UNIT III: Web Security

Overview of Web Server Security. *Goal of Server Attack.* Web site defacement. Data corruption. Data Theft. Types of Attacks. **Web Server Protection:** FTP (File Transfer Protocol) SMTP (Simple Mail Transfer Protocol). NTP (Network Time Protocol),

Intrusion detection systems: Types of IDSs. Goal for Intrusion Detection systems, IDS Strength and Limitation.

Electronic Mail Security: Security for E-mail. Designs, Example of Secure Email Systems, Pretty Good Privacy (PGP): How PGP works? *S/MIME (Secure Multipurpose Mail Extension):* MIME overview. S/MIME functionality.

UNIT IV: Wireless Application Protocol Security (WAP):

Privacy Enhanced Mail (PEM): How PEM works?

Secure Socket Layer (SSL): The Position of SSL in TCP/IP Protocol Suite. How SSL Works? The Handshake Protocol. The Record Protocol. The Alert Protocol.

The WAP Stack: The Security Layer-Wireless Transport Layer Security (WTLS).

IP Security: Introduction and Overview: IPSec Protocols. The Internet Key Exchange (IKE) Protocol. Security Association (SA), Authentication Header (AH), Encapsulating Security Payload (ESP), IPSec Key Management.

Text Books:

1. Cryptography and Network Security: Principles and practices. Third Edition, William Stallings-Hardcover 2002

2. .Cryptography and Network Security, First Edition Atul Kahate, Tata McGraw-Hill, ISBN 0070494835, 9780070494831.

3. The complete Reference Network Security First Edition, by Bragg, Rhodes-Ousley. Paperback,2003, ISBN-13: 078-3254041301

4. Security in Computing First Editon, C. P. Pfleeger, and S. L. Pfleeger, Pearson Education.

M.Sc.SE-205 Elective II (3) Network Programming 4 Credit

UNIT I: Introduction

A Simple Daytime Client, Protocol Independence, Error Handling: Wrapper Functions, A Simple Daytime Server

Sockets Introduction

Socket Address Structures, Value-Result Arguments, Byte Ordering Functions, Byte Manipulation Functions, inet_aton, inet_addr, and inet_ntoa Functions, inet_pton and inet_ntop Functions, sock_ntop and Related Functions, readn, writen, and readline Functions, isfdtype Function. What is a Socket? Using Sockets

UNIT II: Elementary TCP Sockets

Socket Function, connect Function, bind Function, listen Function, accept Function, fork and exec Functions, Concurrent Servers, close Function, getsockname and getpeername Functions

UNIT III: TCP Client-Server Example

TCP Echo Server: main Function, TCP Echo Server: str_echo Function, TCP Echo Client: main Function, TCP Echo Client: str_cli Function, Normal Startup, Normal Termination, Connection Abort before accept Returns, Termination of Server Process, SIGPIPE Signal, Crashing of Server Host, Crashing and Rebooting of Server Host, Shutdown of Server Host [Book-1]

UNIT IV: I/O Multiplexing: The select and poll Functions

I/O Models, select Function, str_cli Function (Revisited), Batch Input, shutdown Function, str_cli Function (Revisited Again), TCP Echo Server (Revisited), pselect Function, poll Function, TCP Echo Server (Revisited Again) [Book-1]

Socket Options

getsockopt and setsockopt Functions, Checking If an Option Is Supported and Obtaining the Default, Socket States, Generic Socket Options, IPv4 Socket Options, ICMPv6 Socket Option, IPv6 Socket Options, TCP Socket Options

UNIT V: Elementary UDP Sockets

recvfrom and sendto Functions, UDP Echo Server: main Function, UDP Echo Server: dg_echo Function, UDP Echo Client: main Function, UDP Echo Client: dg_cli Function, Lost Datagrams, Verifying Received Response, Server Not Running, Summary of UDP example, connect Function with UDP, dg_cli Function (Revisited), Lack of Flow Control with UDP, Determining Outgoing Interface with UDP, TCP and UDP Echo Server Using select [Book-1].User Datagram Protocol, File Transfer, Error Handling [Book-2]

UNIT VI: Protocols, Sessions, State, and Implementing Custom Protocols

State vs. Stateless, Methods for Maintaining State, What Is a Protocol? Designing a Custom Protocol, Our Chat Protocol, Protocol Registration [Book-2].

References:

1. Unix Network Programming, Volume 1: The Sockets Networking API, 3/E by W. Richard Stevens, Bill Fenner, Andrew M. Rudoff, PHI
2. The Definitive Guide to Linux Network Programming, First Eddition, by KEIR DAVIS, JOHN W. TURNER, AND NATHAN YOCOM, Apress.