Programme : Diploma in CM/IT
Programme Code : 06/07
Name of Course : Project & Seminar (In-house / Industry)
Course Code : CM561
Pre-Requisite : 90 Credits

Teaching Scheme:

	Hours /Week	Total Hours
Theory	**--**	**--**
Practical	**08**	**128**

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	--	--	--	--	--
Marks	**50**	--	--	**50**	**50**

Course Rationale:

In the field of Computer and Information Technology various technologies (hardware and Software) needs to be integrated and proper paradigms needs to be implemented to develop any kind of computer applications . Hence it becomes essential to get hands on experience for developing industrial applications. This subject is essential to understand the implementation of the system development process i.e analyze, design, coding, debugging and testing. This will help the students to acquire skills and attitudes to work as programmer or Network administrator.

Furthermore the student will be able to find out various sources of technical information and develop self-study techniques to prepare a project and write a project report.

Course Objectives:

After studying this course, the student will be able to Work in Groups, Plan the work, and Coordinate the work.

(1) Develop leadership qualities.

(2) Develop Innovative ideas.

(3) Practically implement the acquired knowledge.

(4) Develop basic technical Skills by hands on experience.

(5) Write project report.

(6) Develop skills to use latest technology in Computer/Information Technology field.

(7) Analyse the different types of Case studies.

Course Content:

Chapter No.	Name of Topic/Sub topic
1	**Software Oriented Projects**
	1) Develop Application Software for Hospital / Shopping Mall/Cinema Theatre/Commercial Complex/Educational Institute/Industrial Complex, etc 2) Develop In house Systems. 3) Case Studies Related to Industries – Operation / Maintenance / Repair and Fault Finding. 4) Develop Information Processing System. 5) Develop Web Based Applications using Web Technologies. **6)** Develop Network monitoring system.

2	**Hardware Oriented Projects**
	1) Develop Intrusion Detection System. 2) Develop Speech Recognition System. 3) Develop Image Processing Systems. 4) Develop Expert Systems. 5) Develop Artificial Intelligence based Systems. 6) Develop various types of Interfacing Applications. **7)** Develop device Controllers.
3	**Seminar**
	Seminar on any relevant latest technical topic based on latest research, recent trends, new methods and developments in the field of Computer Engineering / Information Technology.

References :

Sr. No.	Magazines
1.	IEEE Transactions/Journals
2.	Computer Today.
3.	PC Quest.
4.	Data Quest
5.	Any Journal Related to Computer/Information Technology/Electronics field.
6.	Computer World
7.	Chip
8.	IT World

(Prof. S. B. Nikam)
Prepared By

(Prof. S. B. Kulkarni)
Secretary, PBOS

(Prof. S.B.Nikam)
Chairman, PBOS

Programme	**:**	Diploma in Computer Engineering/Information Technology
Programme Code	**:**	06/07
Name of Course	**:**	LINUX: Operating System
Course Code	**:**	CM562

Teaching Scheme:

	Hours /Week	Total Hours
Theory	**04**	**64**
Practical	**02**	**32**

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	Two class tests , each of 60 minutes	3Hrs.	--	--	--
Marks	**20**	**80**	**50**	--	**25**

Course Rational:

Linux Operating System is Open source and freely distributed O.S. Apart from the fact that it's freely distributed, Linux's functionality, adaptability and robustness makes it highly suitable for server platform. The course aims at providing in depth knowledge of shell and command line essentials.

Course Objectives:

After studying this course, the student will be able to

- Install and Configure Linux O.S.
- Operate Linux Operating System efficiently.
- Develop programs using shell programming.
- Use and implement various commands of Linux: Operating System
- Configure Users and Groups on Linux Operating System.

Course Content:

Chapter No.	Name of Topic/Sub topic		Hrs	Weightage
1	**Introduction to Linux Operating system:**			
	1.1	Operating system and Linux	**04**	**06**
	1.2	History, Overview of Linux		
	1.3	Shell: Bourne, Korn, Cshell		
	1.4	File structure : Directories and files		
	1.5	Utilities: Editors. Filters and Communications, Linux software and information sources on the internet		
	1.6	Linux releases, OpenLinux, Linux File Systems(ext) and versions.		
2	**Linux startup and setup:**			
	2.1	Accessing your Linux system	**04**	**04**
	2.2	Linux commands and command line editimg		
	2.3	Online manual, Online Documentation		
	2.4	Installing software packages		
	2.5	Command Line Installation: Red Hat Package Manager		
3	**The Linux File Structure**:			
	3.1	Linux Files, The File Structure	**08**	**10**
	3.2	Listing, Displaying and Printing Files: ls, cat, more and lpr, Managing Directories: mkdir, rmdir, ls, cd and pwd, File and Directory Operations: find, cp, mv, rm and ln		
	3.3	Shell Operations: The Command Line, Special Characters		

Chapter No.		Name of Topic/Sub topic	Hrs	Weightage
	3.4	File Name Arguments: *, ?, [ ], Standard Input/ Output and Redirection		
	3.5	Pipes:| Redirecting and Piping the Standard Error: > and 2> , shell Variables		
	3.6	Shell Scripts: User-Defined Commands, invoking command history.		
4	**File Management Operations:**			
	4.1	Displaying File Information : inodes, inodes and directories, cp and inodes, mv and inodes, rm and inodes, ls –l	**08**	**10**
	4.2	File and Directory Permissions: chmod		
	4.3	File Systems: mount and umount		
	4.4	File and Devices: tar		
	4.5	Network File Systems: NFS and etc/exports, Archive		
	4.6	File Compression: gzip, Installing Software from Compressed Archives: .tar.gz, Compiling Software, The mtools Utilities : msdos		
5	**Networking**			
	5.1	Electronic Mail: Local and Internet addresses.	**08**	**10**
	5.2	The Mail Utility, Communications with Other Logged-in Users: Write and Talk, Internet		
	5.3	Tools: Internet Addresses, Remote Login: telnet		
Section II				
6	**Editors and Utilities**:			
	6.1	The vi Editor: vi Command, Input, and Line Editing Modes	**08**	**08**
	6.2	Creating, Saving and Quitting a File in vi, Managing Editing Modes in vi		
	6.3	vi Editing Commands: Common Operations, Advanced vi Editing Commands		
	6.4	Line Editing Commands, Options in vi: set and .exrc		
7	**Shells**:			
	7.1	Filters and Regular Expressions: Using Redirection and Pipes with Filters: cat, tee, head and tail	**12**	**16**

Chapter No.		Name of Topic/Sub topic	Hrs	Weightage
	7.2	Types of Filter Output : wc, spell and sort, Searching Files: grep and fgrep, Editing Filters, Regular Expressions		
	7.3	The Bourne Again Shell(BASH): Command and File Name Completion, Command Line Editing, History, Aliases, Controlling Shell Operations		
	7.4	Configuring Your Login Shell with Special Shell Variables, BASH Shell Programming, Variables and Scripts		
	7.5	Arithmetic Shell Operations: let, Control Structures		
8	**System Administration** (Managing Users and Groups)			
	8.1	System Management : Superuser-The root User Desktop, System Time and Date	**12**	**16**
	8.2	Scheduling jobs with crontab : cron daemon, crontab options, The format of crontab file, Environment variable settings, crontab command lines		
	8.3	System states :init Shutting down and changing Runlevels, Managing Users and Groups: Adding and Removing users with adduser,usermod and userdel commands		
	8.4	Adding and Removing groups with groupadd,groupmod and groupdel commands		
	8.5	Installing and Managing Devices: Creating device files mknod, Installing and managing printers.		
	8.6	Jobs: Background, Kills and Interruptions and setting process priority Get Process status, Find Processes by Pattern or User, Display the Most Active Processes,Kill processes		
		Total	**64**	**80**

List of Practicals / Experiments/Assignments:

Sr. No.	Name of Experiment/Assignment	Hrs
1	• Installing Linux: - Hardware, Software , Requirements, Opening Disk space for Linux partitions • Virtual Consoles • Configuring GRUB / LILO Boot Loader.	04
2	• Executing commands related to Login into user accounts, start up and shutdown commands, command line editing commands, man, who, who am i ,info , pwd. • Practising Absolute and Relative Pathnames	02
3	• Executing various file Related commands – cd ,ls ,cp, mv , rm, touch, mkdir,rmdir,ln • Executing Commands I/O redirection and pipes. • Performing various file management operations through following commands- file , cat, less, find,slocate	04
4	• Using pattern matching commands grep and egrep, sed and awk. • Using wild card characters • Practicing mounting unmounting external devices. • Setting/Changing file and directory related permissions chmod and umask command.	04
5	• Executing commands like mail, smail, write, talk for sending electronic mails • Configuring telnet	02
6	• Executing various commands related to vi Editor. • Practising editing with vi editor • Practising opening and copying from /to multiple files at a time. • Attaching with mail.	04
7	• Executing various Shell commands • Creating shell variables • Writing shell scripts using decision making and various control structures. • Executing various shell utilities • Using file test and string test conditions in scripts. • Making use of Positional Parameters.	06

	• Configuring your own login shell. • Using Functions in Shell scripts.	
8	• Adding and Removing users through commands. • Installing and managing devices. • Adding and removing groups. • Adding and removing users to and from the group. • Scheduling periodic processes cron utility. • Using fdisk utility. • Changing Runlevels. • Executing commands for process management –ps, fg, bg, kill ,killall, nice, at ,jobs	06
	Total	**32**

Instructional Strategy:

Sr. No.	Topic	Instructional Strategy
1	Linux startup and setup:	Lecture method and Demonstration
2	The Linux File Structure:	Lecture method and Demonstration
3	File Management Operations:	Lecture method and Demonstration
4	Networking	Lecture method and Demonstration
5	Editors and Utilities:	Lecture method and Demonstration
6	Shells:	Lecture method and Demonstration
7	System Administration (Managing Users and Groups)	Lecture method and Demonstration
8	Linux startup and setup	Lecture method and Demonstration

Text Books:

Sr. No	Author	Title	Publication
1	Peterson	The Complete Reference Linux (Second Edition)	Tata McGraw Hill
2	Jon Emmons, Terry Clark	Easy Linux Commands	SPD

Reference Books:

Sr. No	Author	Title	Publication
1	Kerry Cox	Red Hat Linux	PHI

Guideline for conducting practical examination : Practical may include assignments for writing various shell scripts, set of commands, shell configuration and assignments using pattern matching languages like awk and other based on above contents.

Learning Resources: Books, LCD, White board.

Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1.	Linux Operating system	04	02	00	06
2.	Linux startup and setup	02	--	02	04
3.	The Linux File Structure	04	02	04	10
4.	File Management Operations	02	04	04	10
5.	Networking	02	04	04	10
6.	Editors and Utilities	04	02	02	08
7.	Shells	04	06	06	16
8.	System Administration	02	06	08	16
	Total	**24**	**26**	**30**	**80**

(Prof. Smt. M.H.Thakare)
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Programme : Diploma in CM / IT
Programme Code : 06 / 07
Name of Course : JAVA Programming
Course Code : CM563

Teaching Scheme:

	Hours /Week	Total Hours
Theory	**04**	**64**
Practical	**02**	**32**

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	Two class tests , each of 60 minutes	3Hrs.	--	--	--
Marks	**20**	**80**	**50**	**--**	**25**

Course Rationale:

In the Era of Web technology it is essential for every Diploma Engg To have knowledge of Internet programming. This course covers JAVA as a programming language.

Course Objectives:

After studying this course, the student will be able to

- Design and implement classes and methods
- Understand and implement basic programming constructs
- Apply object oriented features to real time entities
- Differentiate between primitive data types and class data types and implement conversion between them.
- Understand and implement the concept of reusability and extensibility
- Create packages and interfaces and used it in programs
- Design and implement multithreaded programs
- Manage errors and exceptions
- Design and implement applet and graphics programming
- Make use of Data streams in programs
- Write programs by combining all features of Java

Course Content:

Chapter No.	Name of Topic/Sub topic		Hrs	Weightage
SECTION - I				
1	**Java Evolution and Overview of Java Language**			
	1.1	Java Features, Java Environment, Simple Java Program	**10**	**10**
	1.2	Java Virtual Machine, Constant, Variables, Data Types, Operators and Expressions		
	1.3	Decision making and Branching, Decision making and Looping		
2	**Classes, Object and Methods**			
	2.1	Defining a class, Fields declaration, Methods declaration, Creating object, Accessing class members	**12**	**15**
	2.2	Constructors, Methods Overloading, Static Members, Nesting of methods		
	2.3	Inheritance: Extending a Class (Defining a subclass Constructor, Multilevel inheritance Hierarchical inheritance)		
	2.4	Overriding Methods, Final variable and Methods, Final variables and methods, Final classes, Finalizer Methods		
	2.5	Abstract methods and Classes, Methods with Var args, Visibility Control (Public access, friend access, Protected access, Private access, Private Protected access)		
3	**Array, Strings ,Vectors, Interfaces and Packages**			
	3.1	Arrays, One Dimensional arrays, Creating an array, Two Dimensional arrays	**10**	**15**
	3.2	Special String Operations, Character Extraction, String Comparison, Searching Strings, Modifying a String, Data conversion using ValueOf(), StingBuffer		
	3.3	Vectors, Wrapper Classes, Enumerated Types, Annotations		

	3.4	Interfaces: Defining interfaces, Extending interfaces, Implementing interfaces, Accessing Interface variables.		
	3.5	Packages: Java API Packages, Using System Packages, Using system Package, Naming Conventions, Creating Packages, Accessing a package, Using a package, Adding a class to a package, Hiding Classes, Static Import		
SECTION - II				
4	**Multithreaded Programming, Managing Errors and Exceptions**			
	4.1	Creating Thread, Extending a thread class, Stopping and Blocking a thread, Life cycle of thread	**10**	**13**
	4.2	Using thread methods, Thread exceptions, Thread priority, Synchronization, Implementing the 'Runnable'' Interface, Inter-thread communication		
	4.3	Exception : Types of errors, Exceptions, Syntax of Exception Handling code		
	4.4	Multiple catch statements, Using finally statement, Throwing our own Exceptions, Using Exception for Debugging		
5	**Applet and Graphics Programming**			
	5.1	Local and remote applets, How applets differ from applications, Preparing to write applets, Building applet code, Applet life cycle	**12**	**15**
	5.2	Creating an Executable Applet, Designing a Web page, Applet tag, Adding Applet to HTML file, Running the Applet		
	5.3	More about Applet Tag, Passing parameters to applets, aligning the Display, More about HTML Tags, Displaying Numerical values, getting input from the User, Event Handling		
	5.4	Graphics Programming: The Graphics Class, Lines and rectangle, Circle and Ellipse, Drawing Arcs, Drawing Polygons, Line Graphs, Using control loops in Applets, Drawing Bar charts		
	5.5	Introduction to AWT Package, Introduction to Swings		

6	**Managing Input/Output Files in Java**			
	6.1	Concept of Streams, Stream classes, Byte stream classes, character stream classes, using streams, Other useful I/O classes	**10**	**12**
	6.2	Using the file class, Input/Output Exceptions, Creation of files, Reading/writing characters, Reading/writing bytes		
	6.3	Handling primitive data types, Concatenating and Buffering files, Random Access Files, Interactive Input and Output, Other Stream classes		
		Total	**64**	**80**

Note for Practicals : Practicals should be performed using IDE like ECLIPSE

List of Practicals/Experiments/Assignments:

Sr. No.	Name of Experiment/Assignment	Hrs
1	Programs based on basic syntactical constructs of Java like: a) Operators and expressions. b) Looping statements. c) Decision making statements. d) Type casting.	02
2	A simple Java program to demonstrate use of command line arguments in Java	02
3	Programs on Constructor, Methods overloading, Nesting of methods	02
4	Programs to implement single inheritance by applying various access controls to its data members and methods	01
5	Programs to implement multilevel inheritance by applying various access controls to its data members and methods	02
6	Programs to implement inheritance and demonstrate use of method overriding.	01
7	Programs on Abstract method and class	02
8	Programs to practice - use of single Dimensional array. - use of multidimensional array.	01

9	Programs to implement array of objects	01
10	Programs to practice - using String class and its methods. - using String Buffer class and its methods.	02
11	Programs to implement Vector class and its methods.	02
12	Programs to implement Wrapper classes and their methods.	02
13	Programs to demonstrate - use of implementing interfaces. - use of extending interfaces.	02
14	Programs on creating package, Accessing a package, Importing class from other package, Adding a class to a package	02
15	Programs Creating thread, Extending thread class, Stopping and blocking thread, Using thread Method, Thread priority	01
16	Programs showing try and catch for exception handling, Catching invalid command line argument, Multiple catch statement	01
17	Creating executable Applet, Designing a Web page, Adding Applet to HTML file, Passing parameter to Applets	02
18	Programs on drawing lines, rectangle, circle and Ellipse, arcs, Polygons, Applet to draw line graph, Applet for drawing Bar charts	02
19	Programs to demonstrate use of I/O streams	01
20	Programs to demonstrate use of File streams.	01
	Total	**32**

Instructional Strategy:

Sr. No.	Topic	Instructional Strategy
1	Java Evolution and Overview of Java Language	Explanation of basic concepts
2	Classes, Object and Methods	Explanation & Practical implementation
3	Array, Strings ,Vectors, Interfaces and Packages	Explanation & Practical implementation
4	Multithreaded Programming, Managing Errors and Exceptions	Explanation & Practical implementation
5	Applet and Graphics Programming	Explanation & Practical implementation
6	Managing Input/Output Files in Java	Explanation & Practical implementation

Text Books:

Sr. No	Author	Title	Publication
1	E. Balagurusamy	Programming with Java	TMH
2	Herbert Schildt	The Complete Reference Java2	TMH

Reference Books:

Sr. No	Author	Title	Publication
1	Michael Morrison	The Complete IDIOT's Guide To JAVA 2	PHI
2	Joseph L. Weber	Special Edition Using Java 1.2	PHI
3	Cay S. Horstmann	Core Java Volume I	Pearson

Learning Resources: Books, Models

Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1	Java Evolution and Overview of Java Language	04	00	05	09
2	Classes, Object and Methods	04	00	09	13
3	Array, Strings ,Vectors, Interfaces and Packages	09	00	10	19
4	Multithreaded Programming, Managing Errors and Exceptions	04	03	06	13
5	Applet and Graphics Programming	05	04	09	18
6	Managing Input/Output Files in Java	03	01	04	08
	Total	**29**	**08**	**43**	**80**

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Programme : Diploma in Computer Engineering.
Programme Code : 06
Name of Course : Advanced Computer Network
Course Code : CM564
Pre-Requisite : CM467 (Data Communication and Networking)

Teaching Scheme:

	Hours /Week	Total Hours
Theory	**04**	**64**
Practical	**02**	**32**

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	Two class tests , each of 60 minutes	3Hrs.	--	--	--
Marks	**20**	**80**	--	**25**	**25**

Course Rational:

This course is aimed at providing the students with conceptual understanding of issues of Computer Networks with respect to Network and above layers of TCP/IP model. It aims at providing in depth knowledge of Network Organization, addressing, Security and role of various protocols in Internetworking Environment.

Course Objectives:

After studying this course, the student will be able to

- Understand Setting up of a network.
- Understand the use of Internet Protocol.
- Configure Static as well as Dynamic IP Addresses .
- Understand how World Wide Web is organized.
- Explain and compare the different interconnecting systems throughout the world..
- Understand various security and protection issues in the Networking Environment.

Course Content:

Chapter No.	Name of Topic/Sub topic		Hrs	Weightage
	SECTION I			
1	**Network Layer:**			
	1.1	Logical Addressing :IPv4 Addresses- Address space, Notations, classful addressing, classless addressing, , Network address translation(NAT),IPv6 Addresses- Structure, Address space	**12**	**12**
	1.2	Internetworking- Need for Network Layer, Internet as a Datagram network, Internet as a Connectionless Network, IPv4- Datagram, Fragmentation, Checksum, Options IPv6- Advantages, Packet format, Extension headers, Transition from IPv4 to IPv6- Dual Stack, Dual Stack, Tunneling, Header translation		
	1.3	Address Mapping- Mapping Logical to Physical Addresses-ARP, Mapping Physical to Logical Addresses – RARP,BOOTP and DHCP		
	1.4	ICMP- Types of messages, Message format, Error reporting, Query		
	1.5	Delivery- Direct vs Indirect Delivery, Forwarding- forwarding Techniques, Forwarding Process, Routing Table, Unicast Routing Protocols- Optimization, Intra and Interdomain Routing, Distance Vector Routing, Link State Routing, Path Vector Routing, Introduction to multicasting and broadcasting.		
2	**Transport Layer:**			
	2.1	Process to Process Delivery- Client/Server Paradigm, Multiplexing and Demultiplexing, Connectionless vs Connection-Oriented Service, Reliable vs Unreliable	**12**	**16**
	2.2	Three Protocols, User Datagram Protocol(UDP)- Well Known Ports for UDP, User Datagram, Checksum, UDP Operation, Use of UDP, TCP- TCP Services, TCP Features, Segment, A TCP Connection, Flow Control, Error Control, Congestion Control		

	2.3	Data Traffic- Traffic Descriptor, Traffic profiles		
	2.4	Congestion- Network Performance, Congestion Control- Open Loop Congestion Control, Closed Loop Congestion Control, Examples- Congestion Control in TCP and Frame Relay		
	2.5	Quality of Service- Flow Characteristics, Flow Classes, Techniques to Improve QoS- Scheduling, Traffic shaping, Resource Reservation, Admission Control		
3	**Application Layer: DOMAIN NAME SYSTEM**			
	3.1	Name Space- Flat Name Space, Hierarchical Name Space, Domain Name Space- Label, Domain Name, Domain, Distribution Of Name Space- Hierarchy of Name Servers, Zone, Root Server, Primary and Secondary Servers	**10**	**12**
	3.2	DNS in the Internet- Generic Domains, Country Domains, Inverse Domain, Resolution- Resolver, Mapping names to Addresses, Mapping Addresses to Names, Recursive resolution, Iterative Resolution, Caching,		
	3.3	DNS Messages- Header, Types of Records- Question Record, Resource Record, Registrars, Dynamic, Domain Name Systems(DDNS), Encapsulation		
	3.4	REMOTE LOGGING :Remote logging, Telnet		
	3.5	ELECTRONIC MAIL AND FILE TRANSFER: , Electronic Mail- Architecture, User Agent, Message Transfer Agent:SMTP, Message Access Agent: POP and IMAP, Web-based Mail		
	3.6	File Transfer-File Transfer Protocol(FTP), Anonymous FTP		
SECTION - II				
4	**Application Layer (contd..):WWW AND HTTP**			
	4.1	Architecture- Client(Browser), Server, Uniform Resource Locator, Cookies	**07**	**14**
	4.2	Web Documents- Static Documents, Active Documents, HTTP- HTTP Transaction, Persistent vs Non persistent Connection, Proxy Server		

	4.3	Network Management System- Configuration Management, Fault Management, Performance Management, Security and Accounting Management,		
5	**Security:** CRYPTOGRAPHY and NETWORK SECURITY			
	5.1	Introduction to Cryptography- Definitions, Categories, Symmetric Key Cryptography- Traditional Ciphers, Simple Modern Ciphers, Asymmetric –Key Cryptography- RSA, Diffie-Hellman.	**15**	**14**
	5.2	Security Services- Message confidentiality, Message Integrity, Message Authentication, Message Nonrepudiation, Entity Authentication.		
	5.3	Message confidentiality - conf identiality with Symmetric key Cryptography, conf identiality with Asymetric key Cryptography, Message Integrity- Document and fingerprint, Message and message Digest, Difference, Creating and checking the Digest, Hash Function criteria.		
	5.4	Hash Algorythms:SHA-1 , Message Authentication- MAC,Digital Signature- Comparison, Need for Keys, Process, Services, Signature Schemes, Entity Authentication- Passwords, Challenge-response.		
	5.5	Key Management- Symmetric key distribution, Public key distribution.		
6	**Security in the** Internet**:**			
	6.1	IP Security(IPSec)- Two modes, Two Security protocols, Security Association	**08**	**12**
	6.2	Internet Key Exchange(IEK)		
	6.3	PGP- Security Parameters, Services, A Scenario, PGP Algorithms, Key Rings, PGP Certificates		
	6.4	Firewalls- Packet filter firewall, Proxy firewall		
		Total	**64**	**80**

List of Practicals/Experiments/Assignments:

Sr. No.	Name of Experiment/Assignment	Hrs
1	• Study of Network commands like ping ,ipconfig, traceroute • Designing Networks and Subnetworks. • Study of Router Specifications.	08
2	• Configuring Static IP address. • Configuring Dynamic IP address. • Assignments based on Addressing issue.	08
3	• Study of port configuration for any server. • Study of Router, Gateway Specifications. • Study of available ISPs in India	04
4	• Study and Configuration of User agent.	02
5	• Monitoring Network through Network Monitoring Tools.	04
6	• Simulation of various cryptography algorithms.	02
7	• Configuring FTP Server .	02
8	• Configuring Telnet Server	02
	Total	**32**

Instructional Strategy:

Sr. No.	Topic	Instructional Strategy
1	Network Layer :Host-to-Host Delivery, Internetworking, Addressing and Routing	Introduction and Explanation, Slide Presentation
2	Transport Layer : Process-to-process delivery: UDP, TCP	Explanation, Slide Presentation
3	Application Layer: Client-Server Model	Explanation, Slide Presentation
4	Electronic Mail (SMTP) and File Transfer(FTP	Explanation, Slide Presentation, Simulation of Algorithms
5	Security	Explanation ,Slide Presentation, Simulation of Algorithms
6	Security Protocols in Internet: IP level Security**:** IPSEC	Explanation, Presentation

Text Books:

Sr. No	Author	Title	Publication
1	Behrouz **A. Forouzan**	Data Communications and Networking	Tata McGraw Hill (Fourth Edition)

Reference Books:

Sr. No	Author	Title	Publication
1	**Andrew S.** Tanenbaum	Computer Networks	PHI Publications.

Learning Resources: Books, LCD, White board.

Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1.	Network Layer: Host-to-Host Delivery, Internetworking, Addressing and Routing	08	02	02	12
2.	Transport Layer: Process-to-process delivery: UDP, TCP	10	02	04	16
3.	Application Layer: Client-Server Model	10	02	00	12
4.	Electronic Mail (SMTP) and File Transfer(FTP	10	02	02	14
5.	Security	10	02	02	14
6.	Security Protocols in Internet: IP level Security:IPSEC	10	02	--	12
	Total	**58**	**12**	**10**	**80**

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Programme : Diploma in Computer Engineering/Information Technology
Programme Code : 06/07
Name of Course : Object Oriented Programming: C++
Course Code : CM 565

Teaching Scheme:

	Hours /Week	Total Hours
Theory	**04**	**64**
Practical	**02**	**32**

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	Two class tests , each of 60 minutes	3Hrs.	--	--	--
Marks	20	80	50	--	25

Course Rationale:

To study object oriented concepts using C++ language.

Course Objectives:

After studying this course, the student will be able to

- Know Object Oriented concepts.
- Develop object-oriented software using C++ language.

Course Content:

Chapter No.	Name of Topic/Sub topic		Hrs	Weightage
SECTION - I				
1	**Principles of Object-Oriented Programming**			
	1.1	What is Object Oriented Programming?, Programming Paradigm, Benefits of OOP& Applications, Structure of C++ program, A simple C++ program, Creating source file, Compiling & Linking,	**10**	**13**
	1.2	Tokens, Keywords, Identifiers, Basic Data Types, User Defined data types, Derived Data Types, Symbolic Constants, type Compatibility, Declaration Of Variables, Reference Variables		
	1.3	Operators In C++, Scope Resolution Operators, Member Dereferencing Operators, Manipulators, Type Cast Operator, Expressions &their types, Implicit Conversions, Operator Precedence, Control Structure.		
2	**Function in C++**			
	2.1	Introduction, The Main Function, Function Prototyping, Call By Reference, Return By, Reference, Inline Function	**10**	**15**
	2.2	Default Arguments, Const Arguments, Function Overloading, Friend & Virtual Functions		
	2.3	**Classes &** Objects**:** Introduction, Specifying a Class, Defining Member functions, A C++ Program With a Class.		
	2.4	Making An Outside Function Inline, Nesting Of Member Function, Private Member Functions		
	2.5	Arrays Within Class, Memory Allocation For objects Static Data Member, Static Member Functions		
	2.6	Arrays of Objects, Object As a Function Arguments Friendly Functions, Returning Objects, Const Member Function, Pointers To Members.		
3	**Constructors & Destructors**			
	3.1	Introduction, Constructors, Parameterized Constructors Multiple Constructors in a Class	**10**	**12**
	3.2	Constructors With Default Arguments, Dynamic initialization Of Objects, Object Pointers.		

	3.3	Constructing Two Dimensional Arrays, Destructors.		
SECTION – II				
4	**Operator over loading and type conversions**			
	4.1	Introductions Defining Operator Overloading, Overloading Unary Operator, Overloading Binary Operator, Overloading Binary Operators Using Friends	**10**	**10**
	4.2	Manipulation of Strings Using Operators, Rules For Overloading Operators		
	4.3	Type Conversions Overloading, The Subscript operator [ ].		
5	**In heritance: Extending Classes**			
	5.1	Introduction Defining Derived Classes, Single Inheritance	**10**	**10**
	5.2	Making a Private Member Inheritable Multilevel Inheritance, Inheritance, Hierarchical Inheritance, Hybrid Inheritance		
	5.3	Virtual Base Classes, Abstract Classes, Constructors In Derived Classes, and Member Classes: Nesting of classes.		
6	Pointers**, Virtual Function and Polymorphism**			
	6.1	Introduction, Pointers to Objects, this pointer, Pointer to Derived classes, Virtual functions, Pure virtual function	**10**	**12**
	6.2	Managing console I/O Operations, , C++ streams, C++ stream classes, Unformatted I/O operations, Formatted I/O operations managing output with manipulators.		
	6.3	Working with files , Introduction, Classes for file stream operations, Opening & closing a file, Detecting End-of-file, more about open ():		
	6.4	File modes, File pointers and their manipulations, Sequential Input and Output operations		
	6.5	Updating a file: Random access, Error handling during file operations, Command line arguments.		
7	**Templates & Exception Handling**			
	7.1	Class Templates, Class Templates with Multiple Parameters, Function Templates	**04**	**08**

	7.2	Function Templates with multiple parameters, Overloading of Templates function, Member function Templates.		
	7.3	Exception Handling: Introduction, Basics of Exception Handling, Exception handling mechanism		
	7.4	Throwing mechanism, catching mechanism, rethrowing an exception.		
		Total	**64**	**80**

List of Practicals/Experiments/Assignments:

Sr. No.	Name of Experiment/Assignment	Hrs
1	Programs on: 1) cout and cin statements. 2) Operators overloading. 3) One program on each control structure.	04
2	Programs on: 1) One and two dimensional array. 2) function overloading. 3) Simple programs for defining classes and objects.	06
3	Programs on constructors and destructors.	04
4	Programs on: Manipulation of strings using operator.	04
5	Programs on: 1) Derived classes. 2) Constructors in derived classes. 3) Nesting of classes	06
6	Programs on: 1) pointers to objects, 2) pointer to derived classes. 3) Opening and Closing file 4) file pointers and their manipulations.	06
7	Simple programs to handle Templates and exceptions.	02
	Total	**32**

Practical exam guidelines:

- New program statements may be given based on above concepts.

Instructional Strategy:

Sr. No.	Topic	Instructional Strategy
1	Principal of Object Oriented Programming	Explanation of basic concept and implementation
2	Function in C++	Explanation of function and implementation of function
3	Constructors & Destructors	Explanation of constructor & Destructors and implementation of constructor & Destructors
4	Operator Over Loading and Type Conversions	Explanation of operator overloading and implementation.
5	Inheritance: Extending Classes	Explanation of Inheritance & it's type and implementation.
6	Pointer, Virtual Function and Polymorphism	Explanation & Implementation of polymorphism, pointer
7	Templates and Exception handling	Explanation and implementation of templates and implementation using exception handling.

Text Books:

Sr. No	Author	Title	Publication
1	E Balagurusamy	Object Oriented Programming with C++	Tata McGRAW Hill

Reference Books:

Sr. No	Author	Title	Publication
1	Ivor Horton	Beginning C++ - The complete Language	Shroff Publishers
2	Robert Lafore	Object Oriented Programming in C++	BPB
3	Herbert Schildt	Teach Yourself C++	Tata McGRAW Hill
4	Bjarne Stoustrup	The C++ Programming Language	Addison-Wesley 2000

Learning Resources: OHP, LCD, Projector, and Transference, White board.

Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1	Principal of Object Oriented Programming	06	03	04	13
2	Function in C++	04	03	08	15
3	Constructors &Destructors	04	03	05	12
4	Operator Over Loading and Type Conversions	02	02	06	10
5	In heritance: Extending Classes	02	02	06	10
6	Pointer, Virtual Function and Polymorphism	02	02	08	12
7	Templates and Exception handling	03	02	03	08
	Total	**23**	**17**	**40**	**80**

(Prof. Smt. H.S.Chaudhari) Prepared By

(Prof. S. B. Kulkarni) Secretary, PBOS

(Prof. S.B.Nikam) Chairman, PBOS

Programme : **Diploma in Computer Engineering/Information Technology**
Programme Code : **06 / 07**
Name of Course : **Data Structures**
Course Code : **CM566**
Pre-requisite : **CM263(Programming in C)**

Teaching Scheme:

	Hours /Week	Total Hours
Theory	**04**	**64**
Practical	**02**	**32**

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	Two class tests , each of 60 minutes	3Hrs.	--	--	--
Marks	**20**	**80**	**50**	--	**25**

Course Rationale:

In the present era it is very essential to develop programs and organize data in such a way that it solves a complex problem efficiently. Data structure is such a tool, which aims in developing data organizing and programming skills.

Course Objectives:

After studying this course, the student will be able to

- Write programs in 'C ' using different types of data structures.
- Understand concepts of arrays, pointers, link list, stacks, queues, trees, and graphs.
- Use proper data structures for particular problem.
- Develop efficient software using various data structures.

Course Content:

Chapter No.	Name of Topic/Sub topic		Hrs	Weightage
1	**Introduction to data structures**			
	1.1	Basic terminology, data structure operations, complexity, and time space tradeoff.	12	10
	1.2	Arrays in C : Single dimensional , Multi dimensional ,strings , Array operations : Insertion, deletion, traversing, searching: linear, binary search, sorting: Bubble sort, Sparse Matrices.		
	1.3	Pointers in 'C': Pointers and Arrays, Pointers and Functions		
2	**Link Lists**			
	2.1	Structures in 'C', Dynamic memory Allocation	14	15
	2.2	Singly link list, Representation of link list.		
	2.3	Link list operations: creating, traversing, inserting, deleting in sorted as well as unsorted link list.		
	2.4	Header links list, Two-way list, Implementation of link list		
3	**Stacks, Queues & Recursion**			
	3.1	Stacks: Concept, representing stacks in 'C', Applications of stacks	12	15
	3.2	Polish Notations (Prefix, postfix), Infix, Quick sort.		
	3.3	Recursion: Recursive definitions and processes, Recursion in 'C', writing recursive programs factorial, Fibonacci, Ackermann function.		
	3.4	Tower of Hanoi, Implementation of recursive, procedures by means of stack.		
	3.5	Queues: The queue and its sequential representation, concept of queues, priority queues		

SECTION-II				
4	**Trees**			
	4.1	Introduction, Binary trees, Binary tree representation, Traversing binary tree,	**10**	**14**
	4.2	Traversal algorithms using stacks		
	4.3	Header nodes, Threading concept.		
	4.4	Binary search tree (BST), searching and inserting in BST, deleting from BST		
	4.5	Heap, Heap sort, path lengths: Hoffmann algorithm, General trees		
5	**Graphs and their applications**			
	5.1	Introduction, Graph theory terminology	**10**	**14**
	5.2	Sequential representation of graphs, Adjacency matrix, Path matrix		
	5.3	Warshalls algorithm, shortest path		
	5.4	Linked representation of graph, Operations on graphs, traversing a graph		
	5.5	Spanning forest, posets typological sorting.		
6	**Sorting and searching**			
	6.1	General background, Exchange sort, Selection sort and tree sorting, insertion sort, merge sort and radix sort.	**06**	**12**
	6.2	Searching: Basic search techniques, tree searching, hashing, general search trees		
	6.3	Storage management: General trees, automatic lists management, dynamic memory management		
		Total	**32**	**80**

List of Experiments/Assignments:

Sr. No.	Name of Experiment/Assignment	Hrs
1	Write Programs based on:Array operations; insertion, deletion.	01
2	Write Programs based on linear search, binary search.	01
3	Write Programs based on bubble sort	01
4	Write Programs based on multidimensional arrays	01
5	Write Programs based on Pointers and arrays, Pointer & Function	02
6	Write Programs based on Creating a link list	01
7	Write Programs based on ins deleting of the node, counting number of nodes, erting at first node, inserting after given position	02
8	Write Programs based on creating a sorted link list, searching, and reverting	02
9	Write Programs based on two way (doubly) link list.	02
10	Write Programs based on Stack implementation using PUSH & POP operations	01
11	Write Programs based on Queue implementation using PUSH & POP operations	01
12	Write Programs based on Tower of Hanoi	02
13	Write Programs based on Infix to postfix operation	02
14	Write Programs based on Creating a binary tree, in order, preorder and post order traversal	03
15	Write Programs based on Inserting, deleting searching BST	02
16	Write Programs based on Shortest path	01
17	Write Programs based on BFS & DFS using Graph	02
18	Write Programs based on operation of graph	02
19	Write Programs based on Various searching operation	01
20	Write Programs based on Various sorting Method	02
	Total	**32**

Instructional Strategy:

Sr. No.	Topic	Instructional Strategy
1	Introduction to Data Structures	Demonstration of 'C' Compiler, Create simple program array, pointer, string, function.
2	Link Lists	Write 'C' programs based on linked list
3	Stacks, Queues & Recursion	Demonstration of 'C' Compiler, Create simple program Stack,Queue & Recursion.
4	Trees	Write 'C' programs based on Tree
5	Graphs and their applications	Demonstration of 'C' Compiler, Create simple program graphs.
6	Sorting and Searching	Write 'C' programs based on Sorting & searching.

Text Books:

Sr. No	Author	Title	Publication
1	Tanenbaum, Langsman, Augenstein	Data Structures in 'C'	PHI Publications
2	Lipschultz	Data Structures	Schaum Outline Series

Reference Books:

Sr. No	Author	Title	Publication
1	Yashwant Kanetkar	Pointers in 'C'	BPB Publications
2	Tremblie and Sorrenson	Data Structures	TMH Publications

Learning Resources: OHP, LCD, Projector, and Transference, White board.

Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1.	Introduction to Data Structures	07	03	05	15
2.	Link Lists	04	04	07	15
3.	Stacks, Queues & Recursion	03	02	05	10
4.	Trees	04	03	07	14
5.	Graphs and their applications	04	03	07	14
6.	Sorting and Searching	03	03	06	12
	Total	**25**	**18**	**37**	**80**


(Prof. S.V Chavan & Prof. A.S.Paike)
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(Prof. S. B. Kulkarni)
Secretary, PBOS

(Prof. S.B.Nikam)
Chairman, PBOS

Programme : Diploma in Computer Engineering /Information Technology
Programme Code : 06 / 07
Name of Course : Software Engineering
Course Code : CM567

Teaching Scheme:

	Hours /Week	Total Hours
Theory	**04**	**64**
Practical	**02**	**32**

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	Two class tests , each of 60 minutes	3Hrs.	--	--	--
Marks	**20**	**80**	--	**25**	**25**

Course Rationale:

Software has become the key element in the evolution of Computer-based systems and products. Over the past 50 years, software has evolved from a specialized problem solving and information analysis tool to an industry in itself. Software is composed of programs, data and documents. Each of these items comprises a configuration that is created as part of the software engineering process. The intent of software engineering is to provide a framework for building software with higher quality.

Course Objectives:

After studying this course, the student will be able to

- Software and Software Engineering
- Project management concepts
- Project Management estimation and planning
- Project Scheduling and tracking
- Software Quality assurance
- Software Testing Techniques and Maintenance

Course Content:

Chapter No.	Name of Topic/Sub topic		Hrs	Weightage
	SECTION- I			
1	**Software Engineering Concepts**			
	1.1	The Evolving Role of Software	**10**	**12**
	1.2	Software Characteristics and Application		
	1.3	Software Myths		
	1.4	The Process**:** Software Engineering: A Layered Technology -Process, Methods, and Tools		
	1.5	A Generic View of Software Engineering, The Software Process		
	1.6	Software process models -The Linear Sequential model , Prototyping model , RAD Model Evolutionary Software Process Models, Incremental model , Spiral model, WINWIN spiral model, Concurrent development model ,Component-based development model, Formal methods model, Fourth generation techniques .		
2	**Project** Management **Concepts**			
	2.1	The management spectrum :The people,The product, The process, The project, The W5HH principle	**10**	**12**
	2.2	**Software** Process **and Project Metrics :** Measures, metrics, and indicators ,Software measurement :Size-oriented metrics ,Function-oriented metrics, Metrics for software quality affect quality		
	2.3	Establishing a baseline : Metrics collection, computation, and evaluation		
	2.4	Managing variation: statistical quality control ,Metrics for small organizations, Establishing a software metrics program		
3	**Software Project Planning**			
	3.1	Observations on estimating, Project Planning Objectives, Software Scope	**12**	**16**
	3.2	Resources: Human resources, Hardware resources, Software resources, Reusability		

	3.3	Decomposition Techniques: LOC and FP estimation, Effort estimation		
	3.4	Empirical Estimation Models: COCOMO, Putnam estimation model, Function-point models, Automated Estimation Tools.		
	3.5	Risk Analysis and Management**:** Risk identification, Risk projection, Risk assessment, Risk management and monitoring, Risk Refinement and Mitigation, RMMM Plan		
SECTION- II				
4	**Project Scheduling and Tracking**			
	4.1	Basic concepts,-Basic principles :The relationship between people and effort ,An example	**06**	**08**
	4.2	An empirical relationship:-Effort distribution ,Defining a task set for the software project ,Degree of rigor		
	4.3	Selecting the task set :Selecting software engineering tasks		
	4.4	Defining a task network ,Tracking the schedule -Earned value analysis-Error tracking		
5	**Software Quality Assurance**			
	5.1	Quality concepts ,The quality movement, Software quality assurance ,SQA activities, Software reviews	**12**	**16**
	5.2	Defect amplification and removal -Formal technical reviews ,The review meeting ,Review reporting and record keeping		
	5.3	Software reliability -Measures of reliability and availability		
	5.4	The ISO approach to quality assurance system -The ISO 9001 standard ,The SQA plan		
	5.5	Functional modeling and information flow: Data Flow diagrams, extensions for real time systems, Ward and Mellor extensions, Hartley and Pirbhai extensions		
6	**Software Testing Techniques and Maintenance**			
	6.1	Software testing Fundamentals ,Testing objectives ,Testing principles ,Testability	**14**	**16**

	6.2	White box testing :Basis path testing , Flow graph notation, Cyclomatic complexity , Graph matrices , Control structure testing, Condition testing , Data flow testing, Loop testing		
	6.3	Black box testing : Graph based testing methods .		
	6.4	Testing documentation , Testing for real time systems.		
	6.5	Software Maintenance: A definition of software maintenance, Maintenance Characteristics, Maintainability, Maintenance tasks, Maintenance side effects		
	6.6	Reverse engineering and Re-engineering.		
		Total	**64**	**80**

List of Experiments/Assignments:

Sr. No.	Name of Experiment/Assignment	Hrs
1	Study of different models.	02
2	Implementation of planning techniques.	06
3	Perform risk analysis and management of above project.	06
4	Execute the project plan.	06
5	Case study on Software Quality	04
6	Test the project by various testing techniques. Case study on Software Maintenance. Study of Software Engineering Standards	08
	Total	**32**

Instructional Strategy:

Sr. No.	Topic	Instructional Strategy
1	Software and Software Engineering	Explanation & case study
2	Project management concepts	Explanation & case study
3	Project Management estimation and planning	Explanation & case study
4	Project Scheduling and tracking	Explanation & case study
5	Software Quality assurance	Explanation & case study
6	Software Testing Techniques and Maintenance	Explanation & case study

Text Books:

Sr. No	Author	Title	Publication
1	Roger S. Pressman	Software Engineering	Mc. Graw Hill

Reference Books:

Sr. No	Author	Title	Publication
1	Jawadekar	Software Engineering	

Learning Resources: Black Board, LCD Projector, Transparencies

Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1	Software Engineering Concepts	04	04	04	12
2	Project management concepts	06	06	00	12
3	Software Project Planning	06	06	04	16
4	Project Scheduling and tracking	04	04	00	08
5	Software Quality assurance	08	04	04	16
6	Software Testing Techniques and Maintenance	08	04	04	16
	Total	**36**	**28**	**16**	**80**

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