

MASTER OF COMPUTER APPLICATIONS (MCA)

PROGRAMME GUIDE

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INTRODUCTION

Master of Computer Applications is a three-years (6-semester) professional Master's Degree Programme designed to provide a sound theoretical and good practical exposure to the students in the field of computer applications. MCA course is exclusively designed to meet the IT requirement of the organization. It is designed to offer in depth knowledge of recent technologies in use today. Students are also provided extensive laboratory training on the course content and the current requirements of industries and R & D. MCA Programme covers various aspects of Computation Theory, Programming Logic, Design & Optimization, Network, Database, Operating Systems, Mathematics & Finance.

ACADEMIC OBJECTIVES

This program prepares students to take up positions as systems analysts, system designers, programmers and managers in any field related to IT.

It aims at imparting comprehensive knowledge with equal emphasis on theory and practice.

Students are encouraged to spend a full semester working in the industry giving them insight into the workings of the IT world.

This program is designed to impart knowledge and training in the recent advancements and modern trends in the field of computer applications.

PROGRAMME CODE: 1624

DURATION OF THE PROGRAMME:

Minimum Duration 3 years

Maximum Duration 6 years

MEDIUM OF INSTRUCTION/ EXAMINATION:

Medium of instruction and Examination shall be **English**.

**MCA (Master in Computer Applications)
Scheme**

COURSE CODE	COURSE TITLE	Cr.	CA	ETE(Th.)	ETE(Pr.)
TERM 1					
DCAP401	FOUNDATIONS OF COMPUTER PROGRAMMING	4	20	60	20
DENG401	ADVANCED COMMUNICATION SKILLS	4	20	80	0
DMGT409	BASIC FINANCIAL MANAGEMENT	4	20	80	0
DCAP402	DATABASE MANAGEMENT SYSTEMS	4	20	60	20
DCAP403	OPERATING SYSTEM	4	20	80	0
TERM 2					
DCAP404	OBJECT ORIENTED PROGRAMMING	4	20	60	20
DCAP405	SOFTWARE ENGINEERING	4	20	60	20
DCAP406	COMPUTER NETWORKS	4	20	80	0
DCAP407	DATA STRUCTURE	4	20	60	20
DCAP408	WEB PROGRAMMING	4	20	60	20
TERM 3					
DCAP501	MODERN PROGRAMMING TOOLS & TECHNIQUES-I	4	20	60	20
DMTH501	GRAPH THEORY & PROBABILITY	4	20	80	0
DCAP502	COMPUTER ORGANIZATION AND ARCHITECTURE	4	20	80	0
DCAP503	SOFTWARE TESTING AND QUALITY ASSURANCE	4	20	80	0
DCAP504	COMPUTER GRAPHICS	4	20	60	20
TERM 4					
DCAP505	MODERN PROGRAMMING TOOLS & TECHNIQUES-II	4	20	60	20
DCAP506	ARTIFICIAL INTELLIGENCE	4	20	80	0
DCAP507	SYSTEM SOFTWARE	4	20	80	0
DCAP508	DATABASE ADMINISTRATION	4	20	60	20
DCAP509	WINDOWS PROGRAMMING	4	20	60	20
TERM 5					
DCAP601	SIMULATION AND MODELLING	4	20	80	0
DCAP602	NETWORK OPERATING SYSTEMS-I	4	20	60	20
DCAP603	DATAWARE HOUSING AND DATAMINING	4	20	80	0
DCAP604	MODERN WEB PROGRAMMING TOOLS & TECHNIQUES -I	4	20	60	20
DCAP605	ADVANCED DATA STRUCTURE AND ALGORITHMS	4	20	60	20
TERM 6					
DCAP606	BUSINESS INTELLIGENCE	4	20	80	0
DCAP607	WIRELESS NETWORKS	4	20	80	0
DCAP608	REAL TIME SYSTEMS	4	20	80	0
DCAP609	CLOUD COMPUTING	4	20	80	0
DCAP802	INDUSTRY PROJECT	4	0	0	100
TOTAL CREDITS			120		

Course Code:	D	C	A	P	4	0	1	Course Title:	FOUNDATIONS OF COMPUTER PROGRAMMING
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WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	20	60

COURSE CONTENTS:

Sr. No.	Topics
1.	Introduction: ANSI C standard, Overview of Compiler and Interpreters, Structure of C Program ,Programming rules, Execution
2.	Basics-The C Declarations: C Character Set, keywords, : Identifiers, data types, operators, constants and variables Operators & Expressions
3.	Input/ Output in C: Formatting input & output functions.
4.	Decision making statements – if, else if Control Statements: For, do while, while. Control transfer statements - break, continue.
5.	Arrays and Strings: Defining arrays; I/O of arrays, I/O of string data; built-in library functions to manipulate strings, array of strings
6.	Pointer: Introductions, Features, Declaration, Pointers and Arrays, pointers to pointers ,Pointers and strings, Void Pointers
7.	Functions: Defining and accessing a functions, passing arguments – call by value, function prototypes, recursive functions Storage Classes: Storage classes and their usage
8.	Structures & Unions: Defining and processing structures, array of structures, nested structures, Unions & difference from Structures
9.	Files: Opening, reading, writing & Closing file
10.	Additional In C: Dynamic memory allocation, Memory models, Linked List

LABORATORY WORK:

1. Implementation of C Programming Concepts (Operators, Data types, Control Statements, Functions, Arrays, Strings, Structures, Union, Pointers, File Handling)

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Ashok N. Kamthane, "Programming with ANSI & Turbo C", Pearson Education, Year of Publication: 2008
2. Byron Gottfried , "Programming With C", Tata McGraw Hill Publishing Company Limited, New Delhi
3. B.W. Kernighan and D.M. Ritchie, "The C Programming Language", Prentice Hall of India, New Delhi
4. E.Balagurusamy , "Programming in ANSI C ", Tata McGraw Hill Publishing Company Limited, New Delhi.
5. Behrauz A.Foruzan & Richard F.Gilberg , " Computer science – A structure programming approach Using C ", Thomson Asia , 2001.

Course Code:	D	E	N	G	4	0	1	Course Title:	ADVANCED COMMUNICATION SKILLS
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WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
A	<p>Speaking Skills ---to enhance the basic speaking skills, one needs apt language and the correct pronunciation.</p> <ul style="list-style-type: none"> • Simple rules of pronunciation and intonation • Formal oral presentations--- Power point presentations or presentations using other visual aids followed by actual practice of it. <p>Interview Skills—[types of interviews , employer’s expectations, types of questions, some standard questions , answering techniques, mock interviews]. Working with Customers--- essential speaking elements needed to communicate with the customers— [apt questions to determine the context, apt responses to put them at ease, apt responses to acknowledge their efforts, using listener centered language , asking questions to understand their problems , establish rapport , denying requests, coping with angry customers.Improving Informal Communication—speaking persuasively, negotiating effectively, managing conflicts. Formal and regularly used expressions in given situations. Group Discussions---- a detailed briefing of do's and don'ts followed by GD's based on topics relevant to their field. Kinds of GD's—to convey information or to instruct or solve problems or to take decisions</p>
B	<p>Reading Skills—skills we need to read successfully Reading Strategies / Techniques / Types: equipped with separate and adequate reading passages to practice the skill Comprehension of Written Texts : selecting information, identifying topic -shift, cause - effect, point of view [the texts are articles / editorials etc., from varied streams of subjects] Aesthetic Reading Skill- poem-- “Raisin In the Sun” – Langston Hughes --“ways to kill a Man”—Edwin Brock</p>
C	<p>Writing Skills – to reinforce the grammatical structures Grammar – Subject – Verb agreement, Basic sentence patterns, Conditional sentences, Subordinating Conjunctions, Correlative Conjunctions, One Word Substitutes</p>
D	<p>Writing skills --to enhance formally structured effective official writing</p> <ul style="list-style-type: none"> • Understanding Reports and Proposals • Types of reports • Structure and Layout of a Formal Report—writing the beginning / the body / end matter • Business Reports • Writing Short Reports • Proposal Writing and Process Description • Technical Proposals • Writing Proposals • Supplementary Parts / Appended Parts • Citing sources

READINGS: SELF LEARNING MATERIAL.

Course Code:	D	M	G	T	4	0	9	Course Title:	BASIC FINANCIAL MANAGEMENT
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WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	Meaning, Objectives and Scope of Financial Management
2.	Finance Functions: Investment, Financing, Liquidity & Dividend Decisions, Risk & Return Trade Off.
3.	Sources of Finance: Long term, Medium term & short term; Time Value of Money: Basic Concepts
4.	Cost of Capital: Concept and its significance, measurement of cost of capital of various sources of funds. Weighted average cost of capital.
5.	Capital Structure Decision: Understanding debt and equity.
6.	Theories of Capital Structure, Optimum Capital Structure.
7.	Capital Budgeting: Analytical study of various methods of Capital Budgeting.
8.	Working Capital: Concept and Significance, Determining working capital requirements; Basics of receivables, Inventory and Cash Management.
9.	Dividend Policy: Determinants of Dividend Policy, Theories of dividend and Forms of dividend.
10.	Break Even Analysis.

READINGS: SELF LEARNING MATERIAL

ADDITIONAL READINGS:

1. Shrivastava Rajiv and Mishra Anil, Financial management, Oxford Publications, 2009.
2. Sharan Vyupkesh, Fundamentals of Financial Management, Pearson Education, 2009.
3. Reddy G. Sudarshana, Financial Management, Principles and Practice, 2008.
4. Chandra, Prasana, Financial Management, Tata McGraw Hill, 7e.

Course Code:	D	C	A	P	4	0	2	Course Title:	DATABASE MANAGEMENT SYSTEMS
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WEIGHTAGE		
CA	ETE(Pr.)	ETE (Th.)
20	20	60

COURSE CONTENTS:

Sr. No.	Topics
1.	Database Fundamentals: Database systems, Database Architecture Relational Model, Structure of Relational databases, fundamental, additional and extended relational algebra operations
2.	SQL: Data Definition, datatypes, schema definition, Basic structure of SQL Queries, Creating tables, DML operations, DDL commands for creating and altering, Set Operations, Aggregate Functions, NULL values
3.	Advanced SQL: Subqueries, Nested subqueries, Complex queries, Views, Joined relations, Integrity constraints, Authorization, DCL Commands, Embedded SQL, Dynamic SQL
4.	Relational Languages: Tuple Relational calculus, Domain relational calculus, Query by Example Database design and ER model: Overview of Design process, Entity relationship model, constraints, ER Diagrams, ER Design issues, Weak entity sets, extended ER features
5.	Relational Database Design: Features, Atomic Domains and first normal form, Functional dependency theory decomposition using functional dependencies, decomposition using Multivalued dependencies, database design process Normalization: 1NF, 2NF, 3NF, BCNF, 4NF, 5NF.
6.	Transaction Management: Concept of Transaction, Transaction State, Implementation of atomicity and durability, concurrent execution, Serializability, Recoverability, Implementation of Isolation, testing for Serializability. Concurrency Control: Lock based protocols, Timestamp based protocols, Validation based protocols, Deadlock handling, Insert and Delete operations, Weak levels of consistency
7.	Recovery system: Failure classification, storage structure, recovery and atomicity, log-based recovery, recovery with concurrent transactions, buffer management, failure with loss of non-volatile storage
8.	Query Processing: Overview, measures of query cost, selection operation, sorting, join operation, evaluation of expressions Query Optimization: Transformation of relational expressions, estimating statistics of expression results, Choice of evaluation plans
9.	Parallel Databases: I/O parallelism, Interquery parallelism, Intraquery parallelism, Interoperation parallelism, Interoperation parallelism
10.	Application development and administration: web interfaces to databases, performance tuning

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Author: Silberschatz–Korth–Sudarshan: Database System Concepts, Fourth Edition, Title: Database System Concepts, Publishers: Tata McGraw Hill.
2. Elmasri & Navathe, Fundamentals of Database systems, Addison & Weisely, New Delhi.
3. C. J. Date, Database Systems, Prentice Hall of India, New Delhi.
4. Martin Gruber, Understanding SQL, BPB Publication, New Delhi.
5. Val Occardi, Relational Database: Theory & Practice, BPB Publication, New Delhi.
6. Ivan Bayross, SQL, PL/SQL The Programming Language of Oracle, BPB Publication.

Course Code:	D	C	A	P	4	0	3	Course Title:	OPERATING SYSTEM
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WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	Introduction: Operating system Meaning, Supervisor & User mode, operating system operations & Functions, Types of OS: Single-processor system, multiprogramming, Multiprocessing, Multitasking, Parallel, Distributed, RTOS etc.
2.	Operating System Structure: OS Services, System Calls, System Programs, OS Structures, layered structure Virtual machines,
3.	Processes: Process Concept, PCB, Operation on Processes, Cooperating Processes, Inter process Communication, Process Communication in Client Server Environment. Threads: Concept of Thread, Kernel level & User level threads, Multithreading, Thread Libraries, Threading Issues
4.	Scheduling: scheduling criteria, scheduling algorithms, Type of Scheduling: Long term, Short term & Medium term scheduling, multi-processor scheduling algorithm, thread scheduling,
5.	Process Synchronization: Critical Section problem, semaphores, monitors, Deadlock characterization, Handling of deadlocks -deadlock prevention, avoidance, detection, recovery from deadlock.
6.	Memory Management: Logical & Physical Address space, Swapping, Contiguous memory allocation, paging, segmentation, Virtual memory, demand paging, Page replacement & Page Allocation algorithms, thrashing, Performance issues
7.	File Management: File concepts, access methods, directory structure, file system mounting, file sharing, protection, Allocation methods, Free space Mgt., Directory Implementation.
8.	I/O & Secondary Storage Structure: I/O H/W, Application I/O Interface, Kernel I/O subsystem, Disk Scheduling, disk management, swap-space management, RAID structure.
9.	System Protection: Goals of protection, Access matrix and its implementation, Access control and revocation of access rights, capability-based systems
10.	System Security: Security problem, program threats, system and network threats, cryptography as a security tools, user authentication, implementing security defenses, firewalling to protect systems and networks. Case studies Windows OS, Linux or any other OS

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Silberschatz, Gagne & Galvin, "Operating System Concepts", John Wiley & Sons, Seventh Edition or Latest
2. A.S. Tanenbaum : Operating System : Design and Implementation, Prentice Hall of India.
3. Milankovic, Operating system, Tata Macgraw Hill, New Delhi.
4. Stalling, W., "Operating Systems", 2nd edition, Prentice Hall.
5. Deitel H. M., "Operating Systems, 2nd edition, Addison Wesley.

Course Code:	D	C	A	P	4	0	4	Course Title:	OBJECT ORIENTED PROGRAMMING
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WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	20	60

COURSE CONTENTS:

Sr. No.	Topics
1.	Review: Review of basic concepts of object-oriented programming & Introduction of OOP Languages, Comparison between procedural programming paradigm and object-oriented programming paradigm.
2.	Beginning with OOP Language: Review of Tokens, Expressions, Operators & Control Structures. Scope Resolution operator, member dereferencing operator, Reference Variables Review of Functions, Function Overloading, Inline Functions, Default Arguments
3.	Classes & Objects: specifying a class, Defining member functions, creating class objects, accessing class Members. Access specifiers – public, private, and protected Classes, its members, objects and memory allocation
4.	Static members, the const keyword and classes, the static objects. Friend Function & its usage Empty classes, nested classes, local classes
5.	Constructors & Destructors: Need for constructors and destructors, copy constructor, dynamic constructors, Destructors, constructors and destructors with static members
6.	Operator Overloading & Type Conversion: Defining operator overloading, rules for overloading operators, Overloading of unary operators and various binary operators with friend functions and member functions Type conversion – basic type to class type, class type to basic type, class type to another class type
7.	Inheritance: Introduction, defining derived classes, forms of inheritance, Ambiguity in multiple and multipath inheritance, virtual base class, Overriding member functions, order of execution of constructors and destructors Virtual functions & Polymorphism: virtual functions, pure virtual functions, abstract classes, introduction to polymorphism
8.	Pointers & Dynamic Memory Management: understanding pointers, accessing address of a variable, declaring & initializing pointers, Pointer to a pointer, pointer to a function, dynamic memory management new and delete operators, this pointer
9.	Console I/O: concept of streams, hierarchy of console stream classes, Unformatted I/O Operations, Managing output with manipulators
10.	Working with Files: Opening, Reading, Writing, Appending, Processing & Closing difference type of files, Command line Arguments

LABORATORY WORK:

Sr. No.	Topics
1.	Implementation of Concepts of OOP using C++ covered in the syllabus

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Robert Lafore, "Object Oriented Programming with C++", Galgotia.
2. Author: Herbert Schildt, Title: Teach Yourself C++, Publishers: Tata Mc Graw Hill, Year of Publication: 2005.
3. J Marget A. Ellis and Bjarne Stroustrup, The Annotated C++ reference manual, Addison Wesley New York.
4. Waite Group Lafore R., Object oriented programming in C++, Waite Group Lafore R.
5. Lippman F. B. C++ Primer, Addison Wesley
6. E. Balagurusamy, "Object Oriented Programming with C++", Tata McGraw Hill

Course Code:	D	C	A	P	4	0	5	Course Title:	SOFTWARE ENGINEERING
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WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	20	60

COURSE CONTENTS:

Sr. No.	Topics
1.	Introduction to Software Engineering: The Evolving Role of Software, Software, Software Myths.
2.	A generic view of Process: Software Engineering-A Layered Technology, A process framework, The Capability Maturity Model Integration, Process Patterns, Process Assessment.
3.	Process Models : Prescriptive Models, The Waterfall model, Incremental Process Models : The Incremental model, The RAD model Evolutionary Process models: Prototyping, The Spiral model, The Concurrent Development model, A final comment on evolutionary Processes.
4.	An Agile view of Process : What is Agility, Agile Process models : XP, ASD, DSDM, Scrum, Crystal, FDD, AM. Requirements Engineering: A Brigade to design & construction, Requirements Engineering tasks: Inception, Elicitation, negotiation, Specification, Validation, Requirements Management .
5.	Software Engineering Practice : The Essence of practice, Core Principles, Planning practices, Modelling practices: Analysis modelling principles, Design Modelling principles Construction practice : Coding principles and concepts, Testing principles Design Engineering: Design process & Design Quality. Design Concepts: Abstraction ,Architecture, patterns, Modularity, Information hiding, Functional independence, Refinement, Refactoring, Design Classes
6.	System Engineering : The System Engineering Hierarchy: System Modelling, System Simulation, System Modelling: Hatley-Pirbhai Modelling, System Modelling with UML Creating an Architectural Design: Data design: Data design at the Architectural level & component level, Architectural Design: Representing the system in Context, Defining Archetypes, Refining the Architecture into components, Describing installations of the system.
7.	Testing Strategies: - Testing strategies for conventional software, test strategies for object-oriented software, validation testing, system testing. Requirements Engineering: A Bridge to Design and Construction, Requirements Engineering Tasks: Inception, Elicitation, Elaboration, Negotiation, Specification, Validation, Requirements Management.
8.	Testing Tactics: Black-box testing & white box testing,flow-graph testing,equivalence partitioning,Boundary value analysis, Fault based testing. Building the Analysis Model: Requirements Analysis: Overall objective and philosophy, Analysis rules of Thumb, Domain Analysis, Analysis Modelling approaches. Data Modelling concepts: Data objects, Data attributes, Relationships, Cardinality and Modality
9.	Design Engineering : Design Process and Design quality, Design concepts: Abstraction, Architecture, patterns, Modularity, Information hiding, Functional independence, Refinement, Refactoring, Design classes
10.	Creating an Architectural Design : Data design: Data design at the Architectural level and Component level, Architectural Design: Representing the system in Context, Defining Archetypes, Refining the Architecture into Components, Describing installations of the system

LABORATORY WORK:

Sr. No.	Topics
1.	Various Tools available for CASE (Computer Aided Software Engineering).
2.	Practical to show how to create an information gathering document.
3.	Finalizing the SRS Document based upon the information gathered and analysis of the same.
4.	How to Create Use Cases.
5.	How to Create ER Diagrams.
6.	Developing Test Cases and Test Plan.

READINGS: SELF LEARNING MATERIAL.**ADDITIONAL READINGS:**

1. R.S. Pressman, Title: Software Engineering – A Practitioner’s Approach
Publishers: McGraw Hill, 6th edition
2. P. Jalote, "An Integrated approach to Software Engineering", Narosa.
3. R. Fairley, "Software Engineering Concepts", Tata McGraw Hill, 1997.
4. Software Engineering by Ian Sommerville, Pearson Education.

Course Code:	D	C	A	P	4	0	6	Course Title:	COMPUTER NETWORKS
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WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	Introduction to Computer Networks: uses of computer networks,
2.	Network hardware, network software, Reference models, Example networks
3.	Physical Layer : Theoretical Basis for Data Communication, Guided Transmission Media, Wireless Transmission, Communication Satellites
4.	Public Switched Telephone Network, The Mobile Telephone System, Cable television
5.	Data Link Layer: Design Issues, Error Detection and Correction
6.	Elementary data link protocols, Sliding – Window protocols, Protocol verification, Example Data Link Protocols
7.	The Medium Access Control Sub Layer: The Channel Allocation Problem
8.	Multiple Access Protocols, Ethernet, wireless LANs, Bluetooth, Data Link Layer Switching.
9.	Network Layer: Design Issues, Routing Algorithms, Internetworking, network Layer in the Internet, Congestion Control Algorithms, Quality of service
10.	Transport Layer: Transport Service, Elements of Transport Protocols, The internet transport protocols: UDP,TCP Application Layer: DNS ,E-mail, The World Wide Web, Multimedia , Network Security - Cryptography

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

- 1.A.S. Tananbaum, "Computer Networks", Pearson Education, Delhi, Fourth edition, Year of Publication: 2009.
2. Behnouz A. Forouzan, "Data Communication and networking", 2nd Ed. Update, Tata McGraw Hills 2003
2. Black U, "Computer Networks-Protocols, Standards and Interfaces", PHI 1996
3. Comer E. Douglas, "Computer Networks and Internets", 2nd Ed., Pearson, 2000
4. W. Stallings, "Data and Computer Communications", 7th Ed., Pearson, 2002.
5. Laura Chappell (Ed), "Introduction to Cisco Router Configuration", Techmedia, 99

Course Code:	D	C	A	P	4	0	7	Course Title:	DATA STRUCTURE
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WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	20	60

COURSE CONTENTS:

Sr. No.	Topics
1.	Basic concepts and notations , data structures and data structure operations
2.	Complexity Analysis: Mathematical notation and functions, algorithmic complexity and time space trade off, Big O Notation , The best, average & Worst cases analysis of various algorithms.
3.	Arrays: Linear & Multidimensional Arrays, Representation & traversal
4.	Pointers , Array Pointers, Records and Record Structures, Representation of Records in Memory; Parallel Arrays
5.	Linked list: representation, traversal, searching, Insertion, deletion of linked list. Two way / multi linked structures , Header Lists, Circular Lists
6.	Stacks: Basic operation of Stack, Memory Representation, Traversal. Queues: Operations, Representation & Types.
7.	Recursion: Definition, Function Call & Recursion implementation, Anatomy of Recursive Call, Complexity issues
8.	Trees:- Definition, Representation in memory.
9.	Binary trees: Binary tree traversal, Insertion, Deletion & Searching
10.	Binary Search Trees: Search, Insertion, deletion Intro to Heaps

LABORATORY WORK:

1. Implementation of Arrays, Linked Lists, Stacks, Recursion, Trees and Heaps using C/C++

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Seymour Lipschutz, "Schaum Outline Series", Tata McGraw Hill, New Delhi, Year of Publication: 2006.
2. Mark Allen Weises, Data Structures & Algorithmic Analysis in C, Pearson Education.
3. Adam Drozdek, Data Structure & Algorithms in C++. Thomson.
4. Kruse, Data Structures & Program design, Prentice Hall of India, New Delhi.
5. Tenenbaum, Augenstein, & Langsam, Data Structures using C and C++, Prentice Hall of India, New Delhi.
6. Sorenson and Tremblay : An Introduction to Data Structures with Algorithms.

Course Code:	D	C	A	P	4	0	8	Course Title:	WEB PROGRAMMING
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WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	20	60

COURSE CONTENTS:

Sr. No.	Topics
1.	Internet Fundamentals: Introduction to Internet, Web browser, web page, website, homepage, hyperlinks, hypermedia, HTTP, WWW, Web server, Client server architecture model for web requests, URL
2.	Creating static web pages: HTML document structure, singular and paired tags, text formatting, hyperlinks, adding images, audio and video, creating lists, tables, forms, frames, using multiple windows for web pages
3.	Cascading Style Sheets: Style tag, DIV and SPAN, Internal and External stylesheets, Creating and using Classes, applying style on text and images
4.	Scripting Language Java Script programming, Data Types, Variables, Arrays, Operators. Loops, functions, Dialog boxes, String Manipulation functions, Using Timer in web page. Setting and Getting date object in a web page.
5.	DOM Model. Events handling through JavaScript, How to use forms in JavaScript
6.	ASP: introduction to asp, installing IIS, ASP variable, ASP operators, conditional, loops and case statements and arrays
7.	ASP Web Forms: Introduction to CGI, Client side and server side scripting, building and processing web forms
8.	ASP Objects: Response, Request, Server, Session, Application. Purpose of Global.asa file, #include, Recordset objects
9.	ASP Cookies and Caching Procedures, Cookies, ASP file system, send e-mail, Caching: page, data, fragment, output.
10.	Database Connectivity: Open and Close a connection, reading from the database, inserting, deleting and updating the database records Building Database Applications Using ActiveX Data Objects

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Teach Yourself ASP in 21 Days: Sams publishing.
2. Author: Bayros Ivan, Title: Web Enabled Commercial Application Development Using HTML, DHTML, JavaScript, Publishers: BPB publications.
3. Teach Yourself HTML 4 With XML, DHTML and Java Script - Stephine Cottrell Bryant.
4. An Introduction to Apache : Tata McGraw Hills, New Delhi.
5. HTML Black Book: Galgotia Publications.

Course Code:	D	C	A	P	5	0	1	Course Title:	MODERN PROGRAMING TOOLS & TECHNIQUES -I
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WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	20	60

COURSE CONTENTS:

Sr. No.	Topics
1.	Introduction to Java: Keywords, constants, variables and Data Types, Operators and Expressions, Control constructs, Introducing classes, objects and methods: defining a class, adding variables and methods, creating objects, constructors, class inheritance.
2.	Arrays and String: Creating an array, one and two dimensional arrays, string array and methods, Basics types, Classes and Objects: using super, Multilevel hierarchy abstract and final classes
3.	Arrays and String: Object class, Packages and interfaces, Access protection, Extending Interfaces, packages. Nested Classes, Inner Class Example Enum Types.
4.	Classes: String and String Buffer classes, Wrapper classes, Basics of Standard Java Packages (lang, util)
5.	Exception Handling: Fundamentals exception types, uncaught exceptions, throw, throw, Final, built in exception.
6.	Multithreaded Programming: Fundamentals, Java thread model: priorities, synchronization, messaging, thread classes, Runnable interface, suspending, resuming and stopping threads.
7.	Input/Output Programming: Basics, Streams, Byte and Character Stream, predefined streams, Reading and writing from files. Using Random Access Files.
8.	Applets and AWT controls: Meaning of Applet. AWT controls and Layout managers
9.	Applets and AWT controls: handling Images and sound. Basics of Swing Components and Layouts.
10.	Event Handling: The Event Delegation Model, Event Classes

LABORATORY WORK:

Sr. No.	Topics
1.	Implementation Of JAVA Concepts

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. E. Balaguruswamy, "Programming with Java: A Primer", Mc Graw Hill, Fourth Edition
2. Patrick Naughton and Herbertz Schildt, "Java-2 The Complete Reference", TMH,1999
3. The Java Handbook by Patrick Naughton, Michael Morrison Publisher: Osborne/McGraw-Hill
4. Horstmann, "Computing Concepts with Java 2 Essentials", John Wiley

Course Code: D M T H 5 0 1	Course Title : GRAPH THEORY & PROBABILITY
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WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	<p>Graph Theory:</p> <ul style="list-style-type: none"> • Graph and sub graphs, Isomorphic, homomorphism graphs, Paths, • Hamiltonian Circuits, Eulerian Graph, Connectivity, The Bridges of konigsberg, • Transversal, Multi graphs, Labelled graph, Complete, regular and bipartite graphs, planar graphs, • Graph colourings, Chromatic number, Connectivity, Directed graphs, basic definitions. Tree graphs, • Binary trees, rooted trees, minimal spanning tree, Prim's algorithm, shortest path.
2.	<p>Boolean algebra :</p> <ul style="list-style-type: none"> • Propositions and compound propositions, • Basic logical operations, Truth tables, Tautologies and Contradictions, • Logical equivalence, Logical gates, Logic circuits, and switching function,
3.	<ol style="list-style-type: none"> 1. Partially ordered set, Lattice, Boolean algebra, 2. Lattice as Boolean algebra 3. Application of Boolean algebra to on –off switching theory.
4.	<p>Probability Theory:</p> <ol style="list-style-type: none"> 4. Sample space, events, and probability functions 5. Examples using counting methods, sampling with or without replacement. 6. Algebra of events, Conditional probability, 7. partitions of sample space, theorem of total probability, 8. Baye's theorem, independence, Random variables. 9. Probability mass functions. <p>Discrete distributions: - Binomial, Poisson, geometric. Expectation: - mean and variance</p>

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READING:

1. Rosen Kenneth H, "Discrete Mathematics and its applications", Mcgraw-Hill, International Editions, Singapore, 2000
2. Chapters 15,Lipschutz S and Lipson M, Discrete Mathematics, Tata Mcgraw-Hill publishing House,New Delhi,2000

Course Code:	D	C	A	P	5	0	2	Course Title :	COMPUTER ORGANIZATION AND ARCHITECTURE
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WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	Review of Basics of Digital Electronics: Codes, logic gates, flip flops, registers, counters, multiplexer, demultiplexer, decoder, and encoder.
2.	Integers Representation: Signed Magnitude, 1s & 2s Complement) & Real numbers (Fixed point & Floating Point representation), Register Transfer and Micro operations: Register transfer language Bus & memory transfer, logic micro operation, shift micro operation, Arithmetic Logic Shift Unit
3.	Basic Computer Organization: Instruction codes, computer instructions, timing & control, instruction cycles
4.	Memory reference instruction, Input/output & interrupts, Design of basic computer Control Unit: Hardwired vs. micro programmed control unit, Control Memory, Address Sequencing, Micro program Sequencer
5.	Central Processing Unit: General register organization, stack organization, instruction format, Addressing Modes Data transfer & manipulation, program control, RISC, CISC.
6.	Introduction to Parallel Processing: Pipelining ,Instruction pipeline, RISC Pipeline, Vector Processing
7.	Computer Arithmetic: Addition, Subtraction, Multiplication & Division Algorithm(s), Decimal arithmetic units & Operations.
8.	Input-Output Organization: Peripheral devices, I/O interface, data transfer schemes, program control, interrupt' DMA transfer, I/O Processor
9.	Memory Organization Concepts: Cache & Virtual memory
10.	Multiprocessors: Characteristics, Interconnection Structures, Interprocessor Communication and synchronization

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Morris Mano, "Computer System Architecture", Prentice Hall, Year of Publication: 2007.
2. David A Patterson, Computer Architecture A Quantitative Approach, Pearson Education Asia.
3. P. Pal Choudhuri, Computer Organisation and Design, PHI, New Delhi, 1994.
4. J.P.Hayes, Computer System Architecture, Pearson Education Asia.
5. Ali leigh, System Architecture, South Wester Publishing Co., New Delhi.
6. Parallel Computers by Rajaram & Murthy, EEE .

Course Code:	D	C	A	P	5	0	3	Course Title:	SOFTWARE TESTING AND QUALITY ASSURANCE
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WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	Software Testing: Introduction, Meaning, What is Bug? Reasons of Bugs, Cost of Bugs, Software Tester Task. Introduction to Software Development Models Software Testing: Testing Axioms, Terms & Definitions
2.	Testing Fundamentals: Types, Black Box, White Box, Static & Dynamic Testing. Static Black Box Testing. Dynamic Black Box Testing: Test to Pass & Test to Fail, Equivalence Partitioning, Data Testing, State Testing, , Other Black Box Testing Techniques.
3.	Static White Box Testing: Formal Reviews, Peer Reviews, Coding Standards and Guidelines. Review Check List Dynamic White Box Testing: Comparison with Debugging, Testing Pieces: Unit & Integration Testing. Data Coverage & Code Coverage.
4.	Configuration Testing: Overview, Software and Hardware Devices. Deciding Hardware Configurations. Compatibility Testing: Overview, Backward and Forward Compatibility. Testing Multiple versions. Data Sharing Compatibility User Interface Testing: Effective UI, Testing for Disabled.
5.	Documentation Testing: Types of Documentation, Importance of Documentation Testing. Security Testing: Threat Modelling, Buffer Overrun, Safe String Functions, Computer Forensics
6.	Web Site Testing: Web Page Fundamentals, Black Box Testing: Text, Hyperlinks, graphics, Forms. Gray Box Testing & White Box Testing, Configuration and Compatibility Testing
7.	Testing Tools: Benefits of Automation and Tools. Test Tools, Software Test Automation. Random Testing: Monkeys & Gorillas. Bug Bashes & Beta Testing: Test Sharing, Beta Testing, Outsourcing.
8.	Planning Testing: Goals, Test phases, Strategy, Resource Requirements, Schedule, Test Cases, Bug Reporting, Metrics. Test Cases: Test Case Planning, Design, Cases, Procedures, Organization and Tracking. Bug Life Cycle and Tracking System.
9.	Software Quality Assurance: What is Quality? Testing and Quality Assurance in Workplace. Test Management

10.	Organisational Structures: CMM Capability Maturity Model, ISO 9000.
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READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Software Testing by Ron Patton, Sams
2. Software Quality Assurance, by Daniel Galin, Pearson Education
3. Foundations of Software Testing by Aditya P Mathur, Pearson Education
4. Testing and Quality Assurance for Component-based Software, by Gao, Tsao and Wu, Artech House Publishers.
5. Handbook of Software Quality Assurance, by G. Gordon Schulmeyer, James I. McManus, Second Edition, International Thomson Computer Press
6. Software Quality, by Mordechai Ben-Menachem/Garry S. Marliss, by Thomson Learning publication.

Course Code:	D	C	A	P	5	0	4	Course Title :	COMPUTER GRAPHICS
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WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	20	60

COURSE CONTENTS:

Sr. No.	Topics
1.	Fundamentals Of Computer Graphics: Introduction, Overview of Image Representation, RGB Color Model, Display Monitor, Printer ,Mandelbrot Set ,Julia Set
2.	Overview of Graphics I/O Devices: Random scan displays, Raster scan displays, Interactive devices, Logical functioning of I/O devices, Output devices, Frame Buffer, Persistence, Resolution
3.	Scan-Conversion: Scan converting a Line, circle, ellipse, arcs & sectors, polygon, Region filling, Aliasing Effects, Antialiasing
4.	2D Transformations: Scaling, Translation, Rotation, shearing & reflection, Homogeneous Coordinate System, Composite Transformations
5.	Two Dimensional Viewing: Concept of Window, Viewport, Window to viewport Mapping, Graphic Pipeline, Panning, Zooming.
6.	Clipping: Point Clipping, Line Clipping - Cohen Sutherland, Midpoint subdivision, Liang-Barsky algorithm
7.	Polygon Clipping: Sutherland Hodgeman, Weiler Atherton Projection: Perspective Projection ,Parallel Projection
8.	Hidden Surfaces: : Z-Buffer, Scan Line, Back face, Painter's Algorithm, Area Subdivision
9.	Color and Shading Model: Light and Color, Phong Model, Interpolative shading Methods
10.	Texture, Ray Tracing, Additional Visual Effects, Animation, Morphing

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Zhigang Xiang, Roy Plastock, "Computer Graphics (Special Indian Edition) (Schaum's Outline Series)", Tata McGraw Hill, Second Edition
2. Author: Hearn and Baker, Title: Computer Graphics, Publishers: Pearson Education, Delhi Year of Publication: 2007
3. J.D. Foley, A.V. Dam, S.K. Feiner, J.F. Hughes, R.L. Phillips. "Introduction to Computer Graphics", Addison-Wesley Publishing company, N.Y.; Second Edition, 1994.
4. R.A. Plastock and G. Kalley, "Computer Graphics", Schaum Series McGraw Hill, 1986.

Course Code:	D	C	A	P	5	0	5	Course Title:	MODERN PROGRAMMING TOOLS & TECHNIQUES - II
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WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	20	60

COURSE CONTENTS:

Sr. No.	Topics
1.	Introduction: What is C#, Why C#, Evolution of C#, Characteristics of C#, Difference of C# from C++ and Java, Writing a C# program
2.	Variables and Data Types: Variables and Data Types, Boxing & Un-boxing, Operators & Expressions Decision Making and Looping: If, If else if. While, do while, for loop.
3.	Handling Arrays: Declaring Arrays. System.Array class Methods: Declaring Methods, Invoking Methods, Pass by Value, Pass by Reference
4.	Classes & Object in C#: Defining Classes, object, methods. Constructors, Using Polymorphism, Inheritance in classes.
5.	Interfaces: Meaning and Implementation Namespaces: Meaning and its working. Using System Namespace and Object class.
6.	Exception Handling: Exceptions, Multiple Catch Statements, Using Finally Statement, Nested Try Blocks
7.	Windows Programming: Using Controls- textboxes, listbox, buttons, datetime picker, comboboxes etc Common Dialog Boxes: OpenFileDialog, SaveFileDialog, ColorDialog, MessageBox Class and DialogResult Class.
8.	File Input Output: Working with Files and Directories. System.IO.
9.	ADO.NET: Accessing Database with ADO.NET. Executing Insertion, deletion, updation and select command with databases.
10.	XML Basics: What is XML? Data Representation through XML. Working with XMLReader and XMLWriter Classes.

LABORATORY WORK:

1. Implementation of all the concepts covered in syllabus.
2. Classes, methods.
3. Constructors, Polymorphism, Inheritance.
4. Namespaces, Collections.
5. Windows Programming.
6. File I/O.

7. ADO.NET, XML Basics.

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Programming in C# by E. Balagurusamy, Third Edition
2. Samuel J. Leffler Marshall Kirk McKusick Michael J. Karels John S. Quarterman, The programming with C#, Addison Wesley
3. C# Unleashed, Pearson Education
4. C# Black Book, Wiley
5. Beginning C# 2005 by Watson, Skinner, Publisher :Wiley. Year of Publication: 2005

Course Code:	D	C	A	P	5	0	6	Course Title :	ARTIFICIAL INTELLIGENCE
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WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	Introduction and Overview: Meaning Of AI, The AI Problems, Task Domains, AI Technique, Criteria for Success.
2.	Problems, Problem Spaces & Search: Defining The Problem As a State Space Search, Production Systems – BFS, DFS, Heuristic Search, Problem & Production System Characteristics, Issues In The Design Of Search Programs ,Common AI Problems
3.	Heuristic Search Techniques: Generate & Test, Hill Climbing, Best First Search, Constraint Satisfaction, Means-End Analysis
4.	Knowledge Representation: General Concepts Of Knowledge, Approaches of Knowledge Representation, Predicate Logic To Represent Knowledge, Resolution, Unification algorithm
5.	Knowledge Representation using Rules: Procedural Vs Declarative Knowledge, Logic Programming, Forward Vs Backward Reasoning, Matching & Control Knowledge
6.	Symbolic Reasoning Under Uncertainty - Nonmonotonic Reasoning Statistical Reasoning - Probability & Bayes Theorem, Certainty Factors and Rule Based Systems, Bayesian N/W, Fuzzy Logic and applications
7.	Weak Slot And Filler Structures :Semantic Nets, Frames Strong Slot And Filler Structures: Conceptual Dependency, Scripts
8.	Natural Language Processing – Introduction, Steps, Syntactic Processing, Semantic Analysis, Discourse & Pragmatic Processing, Spell Checking
9.	Learning: Meaning, Rote Learning, Learning by taking Advice, Learning from examples, Explanation-Based learning, Expert Systems & Its Architecture, Speech Recognition
10.	Prolog: Introduction, Converting English to Prolog Facts and Rules, Goals, Prolog Terminology, Variables, Control Structures, Arithmetic operators, Matching, Backtracking, Lists, Input/Output and Streams

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Rich, Knight, Nair “Artificial Intelligence”, Tata McGraw Hill, Third Edition
2. D.W.Patterson, Introduction to AI & Expert Systems, Prentice Hall, 1990
3. P. H.Winston:, “Artificial Intelligence”
4. N.J.Nilsson, Principles of Artificial Intelligence, Kaufmann, 1980
5. Charniak & M. Dertmalt, Introduction to AI , Addison Wesley, 1985.
6. A.J. Gongalez & D.D. Dankel, The Engineering of Knowledge based systems theory & practice, Prentice Hall, 1993.
7. G.F.Lager & W.A. Stubblefield, Artificial Intelligence and the design of Expert System , Benjamin Kummings, 1989.

Course Code:	D	C	A	P	5	0	7	Course Title:	SYSTEM SOFTWARE
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WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	Introduction to System Software: Definition, System software, Machine structure, Components of a programming system, Assemblers, linker, loader, compiler, Macros. Evolution of Operating system: Operating system architecture, User function of operating system, Batch control language, OS User Viewpoint: Facilities Note: Students should be allocated programs which can simulate the working of system programs and can be implemented using C / C++ programming.
2.	Machine Structure and Assemblers Basic Functions:- Machine structure, Approach to new machine, machine language, Assembly language
3.	Design of assembler: Design of assembler, Data structure, Format of databases, Algorithm, look for modularity. Table processing: Linear Search, Binary Search, Sorting, Hash Searching
4.	Macro Language :- Macro instructions, Features, Implementation
5.	Introduction to Linking & Loading: Loader Schemes – Compile and Go Loaders, General loader scheme, Absolute Loaders, Subroutine linkage, relocating loaders, direct linking loaders, Other loader schemes – Binders, Linkers, Loaders, Overlays, Dynamic Binders
6.	Design of Absolute loader, Design of Direct-linking loader – problem specification, data structures, format of databases Note: Students should be allocated programs which can simulate the working of system programs and can be implemented using C / C++ programming.
7.	Programming Languages Concept: Importance of high level languages, features, data types and data structure, storage allocation, Accessing of pointers and label variables
8.	Programming Languages Concept: Functional, modularity, Asynchronous operation – conditions, signals, multitasking.
9.	Formal Systems and Programming Languages: Uses of formal systems in programming languages, Formal Specification, Formal Grammars
10.	Formal Systems: Hierarchy of Languages, Backus-Naur Form – Backus Normal Form – BNF, Canonic systems – Syntax specification, specification of translation, recognition and translation algorithm, Canonic systems and formal systems

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Author: John J. Donovan, Title: Systems programming, Publishers: Tata McGraw Hill
2. Dhamdhare, "Systems Programming and Operating Systems", TMH
3. Aho A.V. and J.D. Ullman, "Principles of Compiler Design", Addison Wesley
4. O.G. Kakde, "Compiler Design", Laxmi Publications.
5. Milan Milenkovic, "Operating Systems" Tata McGraw-Hill.

Course Code:	D	C	A	P	5	0	8	Course Title:	DATABASE ADMINISTRATION
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WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	20	60

COURSE CONTENTS:

Sr. No.	Topics
1.	SQL Server RDBMS: What is SQL server, Different Editions of SQL Server, Architecture and Database Objects, SQL server databases, Database storage, Security: windows and SQL server authentication
2.	Installing SQL Server: Installation Planning, requirements SQL Server Tools: Overview of Management Studio , Log File Viewer
3.	SQL Server Storage Architecture: Resource database, database physical structure, database files, transaction log
4.	SQL Server Databases: System Databases. User Databases. Database Planning, Creating Databases, tables, constraints, Database Diagrams, Views, Synonyms, Programming Objects – functions, procedures, triggers
5.	SQL Server Authentication Modes: Principals, Permissions, SQL Server Encryption overview
6.	Configuring SQL Server Network Communication: Network Protocols, Native Client Configuration
7.	Automating Administrative Tasks: Database Mail. Event Notifications. SQL Server Agent. Maintenance Plans.
8.	Disaster Prevention and Recovery: Database Recovery Models. Database Backup: Back Types and options, Backup Strategies. Restoring Databases. Database Snapshots
9.	Monitoring SQL Server for Performance: Overview. Tools and Techniques for Monitoring Performance, Monitoring Database Modifications
10.	SQL Server Integration Services: How to import and export data into and from sql server.

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Title: Beginning SQL Server 2008 Administration, Author: Wood, Leiter, Wrox Publisher: Wiley, Year: 2009.
2. Title: Professional SQL Server 2008 Administration, Author: Wrox, Publications: Wiley, Year: 2009.
3. Title: Microsoft SQL Server 2008 Bible, Author: Paul Nielsen, Mike White, Uttam Parui.
4. Title: Beginning T-SQL with Microsoft SQL Server 2005 and 2008, Author: Paul Turley, Dan Wood, Publication: Wrox.

Course Code:	D	C	A	P	5	0	9	Course Title:	WINDOWS PROGRAMMING
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COURSE CONTENTS:

WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	20	60

Sr. No.	Topics
1.	Windows Programming Basics: The Advantages of Windows, How Windows Programs Work, Running Several Programs Simultaneously, Messages, An Analogy, Structure of a Windows Program, Code and Resources, Program Instances, Compiling Windows Program, Windows Memory Management.
2.	Windows Programming: The Windows.H, The WinMain() Function and Its Parameters, Creating the Programs Window, Messages and Adding a Message Loop, Creating a New Window Class, Message Processing Function WndProc(), Adding Custom Resource Data, Compiling the Resource Data.
3.	Windows Controls: Window, Types of Controls, The CreateWindow() function, Static Controls, Sending Message to a Control, C language Casts, Button Controls, Processing Button Control Messages, Button Notification Codes, List Boxes, Combo Boxes, Scroll Bars, Edit Controls.
4.	Memory Management: Local vs Global Memory, Local Memory Blocks, Using Fixed Memory Blocks, Changing the size of a Memory Block, Using LocalReAlloc(), Discardable Memory Blocks, Global Memory Allocation, What windows is actually doing with Memory, System Memory and System Resources.
5.	Character Sets, Fonts, and the Keyboard: The ANSI Character Set, Trying the Character Functions, Keyboard Message Processing, The WM_CHAR Message, System Key Messages and Dead Characters, Implementing a Simple Keyboard Interface, Selecting a Stock Font, Using Logical Fonts, Text Metric, Putting Fonts to Work, Keyboard Accelerators.
6.	File I/O: How Windows Programs Access Disk Files (Opening, Reading, Writing and Closing), Creating a File Selection Dialogue Box, Creating a Text Editor.
7.	Child and Pop Up Windows: Creating a Child Window, Sending Messages to Child Window, Fixed Child Windows, PopUp Windows.
8.	Menus: Creating Menus, Menus Defined as Resource Data, Creating a Menu Using the Borland Resource Workshop, Complex Menu, Creating a Menu as the Program Operates, Creating Menu Containing Bitmaps, The System Menu.
9.	Dialog Boxes: What is a dialogue box, How a Dialogue Box Work, Designing a Dialogue Box, Using a Dialogue Box, Exchanging Data with a Dialogue Box-Global Variable Method, Problems with using Global Variables, Exchanging Data with a Dialogue Box-Pointer Method, Modal, Modeless and System Modal Dialogue Boxes, Creating Modeless Dialogue Box.
10.	Text & Graphics Output: Character Mode vs Graphics Mode, The Device Context, Windows GDI, Text output, The WM_PAINT Message, Changing the Device Context, Device Context Settings, Graphics Output, Animated Graphics, The Peek Message() Loop.

LABORATORY WORK: Designing windows applications using c++/VC

S. No.	Description
1	Windows Controls
2	Keyboard handling
3	File Handling
4	Graphics and Text ·
5	Handling various techniques like Child Windows, Dialog Boxes, Menus, Memory Management.

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Windows Programming Primer Plus by Jim Conger Galgotia Publication
2. Programming Windows. Charles Petzoid. Microsoft Press 1996.
3. The complete Reference Visual C++5 Chris H. Pappas & William H. Murray, III
4. The Visual C++ handbook Chris H. Pappas & William Murray Osborne

Course Code:	D	C	A	P	6	0	1	Course Title:	SIMULATION AND MODELLING
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WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	Introduction: Simulation of a pure-pursuit problem, System and its model, Simulation of an inventory problem, basic nature of simulation, When to simulate
2.	Simulation of Continuous systems: A chemical reactor, numerical integration Vs Continuous system simulation, Selection of integration formulas
3.	Simulation of a servo system, Simulation of water reservoir system, Analog Vs Digital Simulation
4.	Discrete System Simulation: Fixed time-step vs event-to-event model, Simulating randomness, generation of random numbers
5.	Discrete System Simulation: Generation of non-uniformly distributed random numbers, monte-carlo Vs stochastic simulation
6.	Simulation of Queuing Systems: Rudiments of queuing theory, Simulation of single-server queue, Simulation of two-server queue
7.	Simulation of a PERT network: Network model of a project, Analysis of an activity network, Critical path computation, Simulation of an activity network Computer program for simulation, resource allocation and cost considerations
8.	Design and Evaluation of Simulation Experiments: Length of simulation runs, variance reduction techniques, experimental layout, validation
9.	Simulation Languages: Continuous and Discrete system simulation languages, Continuous simulation languages
10.	Simulation Languages: Block-structured continuous simulation languages, Expression-based languages, Discrete-system simulation languages

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. "System Simulation using Digital Computers" by Narsingh Deo, PHI.
2. "System Simulation" by G. Gordon, PHI.

Course Code:	D	C	A	P	6	0	2	Course Title:	NETWORK OPERATING SYSTEMS-I
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WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	20	60

COURSE CONTENTS:

Sr. No.	Topics
1.	Network Operating System: RedHat Linux, Installing RedHat Linux. Preparing for installation. Booting from CD. Graphical Installation Launch. Setting disk partition levels. Setting Boot Loader, First Boot. Creation of User Account.
2.	RedHat Linux Basics: Working with Desktop. Using Terminal Emulator. File System Hierarchy. Configuring Desktop: working With Desktop Control Center. Understanding Run Levels. Managing Users.
3.	Connecting to Internet: Network Configuration Tool. Connecting to LAN. DNS.
4.	Installing Software: RPM. Meaning, RPM Management Tool. Adding & Removing Packages. Querying RPM Packages.
5.	Shell: Different types of Shells. Common Shell Commands. File System Commands. Environmental Variables.
6.	File System: What is File System. Anatomy of File System. File Permissions and Directories permissions. File Search Utilities.
7.	User Accounts: Super User Vs. Normal User. RedHat User Manager. Creating Groups.
8.	Server Role: Linux as Web Server. Apache Web Server. Installing Apache. Starting Apache. Configuring Web server. Setting up First Web Page.
9.	FTP Server: Meaning, FTP Protocol. Installing vsftpd FTP Server. Starting FTP server. Testing FTP server. Using FTP server. Using FTP Client to Test Anonymous Read Access.
10.	File Server: Overview of Samba Server. Installing SAMBA server. Starting and Stopping the SAMBA server. SAMBA configuration with SWAT. Starting SWAT Service. Adding SAMBA User. Creating and Configuring SAMBA Share.

READINGS: SELF LERNING MATERIAL.

ADDITIONAL READINGS:

1. Title: Beginning RedHat Linux 9 By: Sandip Bhattacharya, Wiley Publications.
2. Red Hat LINUX Unleashed
3. Title: Introduction to Linux, A beginner's guide, Author: Matchel Garless, Fultus Technical library
4. Title: Linux in a nutshell, Author: Ellen Sieve, Aaron Weber, Stephen figgins, O Reilly & Associates
5. Title: Fedora 9 and Red Hat Enterprise Linux Bible, Author: Christopher Negus, Publisher: Wiley

Course Code:	D	C	A	P	6	0	3	Course Title:	DATA WAREHOUSING AND DATA MINING
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WEIGHTAGE	
CA	ETE (Th.)
20	80

COURSE CONTENTS:

Sr. No.	Topics
1.	Data Warehouse Practice: Data warehouse components, Designing the Data Warehouse, Getting Heterogeneous Data into the Warehouse, Getting Multidimensional Data out of the Warehouse.
2.	Data Warehouse Research-Issues and Research: Data Extraction and Reconciliation, Data Aggregation and Customization, Query Optimization, Update Propagation, Modelling and Measuring Data Warehouse Quality, Some Major Research Projects in Data Warehousing, Three Perspectives of Data Warehouse Metadata..
3.	Source Integration: The Practice of Source Integration, Research in Source Integration, Towards Systematic Methodologies for Source Integration.
4.	Data Warehouse Refreshment: Data Warehouse Refreshment, Incremental Data Extraction, Data Cleaning,
5.	Data Warehouse Refreshment: Update Propagation into Materialized Views, Towards a Quality-Oriented Refreshment Process, Implementation of the Approach
6.	Multidimensional Data Models and Aggregation: Multidimensional View of Information, ROLAP Data Model, MOLAP Data Model, Logical Models for Multidimensional Information, Conceptual Models for Multidimensional Information
7.	Query Processing and Optimization: Description and Requirements for Data Warehouse Queries, Query Processing Techniques.
8.	Metadata and Warehouse Quality: Metadata Management in Data Warehouse Practice, A repository Model for the DWQ Framework, Defining Data Warehouse Quality.
9.	Metadata and Data Warehouse Quality: Representing and Analyzing Data Warehouse Quality, Quality Analysis in Data Staging.
10.	Quality-Driven Data Warehouse Design: Interactions between Quality Factors and DW Tasks, The DWQ Data Warehouse Design Methodology, Optimizing the Materialization of DW Views

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Title: Fundamentals of Data Warehouses, Author: Matthias Jarke, Maurizio Lenzerini, Yannis Vassiliou, Panos Vassiliadis, Publisher: Springer
2. Alex Berson, Data Warehousing, Data Mining, and OLAP, Tata Mcgraw Hill,1997
3. George M Marakas, Modern Data Warehousing, Mining & Visualization Core Concepts, Pearson Education,2002
4. Data Mining: Modelling Data for Marketing, Risk and Customer Relationship Mgmt, Author: Rud, olivia, Publisher: Wiley, 2000
5. Data Mining Techniques by Berry, Michael
6. Data Mining, Data Warehousing and OLAP by Sharma, Gajaandra
7. Data Mining with Case Studies by Gupta GK
8. Principles of Data Mining by Hand, David.

Course Code:	D	C	A	P	6	0	4	Course Title:	MODERN WEB PROGRAMMING TOOLS & TECHNIQUES - I
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WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	20	60

COURSE CONTENTS:

Sr. No.	Topics
1.	The .Net Framework: HTML and HTML forms, Server side programming, client programming, Common language runtime, .Net Class library
2.	Visual Studio: Creating Websites, Designing a webpage, The anatomy of a Web Form, Writing Code, Visual Studio Debugging.
3.	Web Form Fundamentals: ASP.NET application, Introducing Server Controls, HTML control classes, The Page Class, Application events, ASP.NET configuration.
4.	Web Controls: Web Control Classes, List Controls, Web Control Events and AutoPostBack, A simple Web Page
5.	State Management: View State, Transferring Information Between Pages, Cookies, Session State, Session State Configuration, Application State.
6.	Error Handling Logging and Tracing: Common errors, Handling Exceptions, Throwing your own Exceptions, Logging Exceptions, Error Pages, Page Tracing.
7.	Validation: Understanding Validation, The validation controls Rich Controls: The calendar, AdRotator, Pages with Multiple view, User Controls and Graphics: User Controls, Dynamic Graphics
8.	Styles, Themes and Master Pages: Styles, Themes, Master Page Basics.
9.	ADO.NET and Data Binding: Configuring your Database, ADO.NET basics, Direct Data Access. Single Value data binding, Repeated Value Data Binding.
10.	Website Security: ASP.NET security Model, Forms Authentication, Windows Authentication. Deploying Web Site: How to deploy the web site. On local IIS or remote IIS.

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Author: Beginning ASP.NET 3.5: In VB 2008 By: Matthew MacDonald, Apress Second Edition
2. Professional ASP.NET 3.5 in C# and VB, Bill Evjen Wiley Publications, 2008.
3. ASP.NET 3.5 Unleashed Stephen Walther, Pearson Education.

Course Code:	D	C	A	P	6	0	5	Course Title:	ADVANCED DATA STRUCTURE AND ALGORITHMS
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WEIGHTAGE		
CA	ETE (Pr.)	ETE (Th.)
20	20	60

COURSE CONTENTS:

Sr. No.	Topics
1.	List: Abstract data types, list adts:array implementation, linked list ,common errors, doubly linked list, circularly linked list, cursor implementation of linked list.
2.	Stack: Stack model, implementation of stacks, applications; queues: queue model, array implementation, applications.
3.	Trees: Binary trees, binary search trees, avl trees.
4.	Splay trees, b-trees.
5.	Hashing: Hash functions, open hashing, closed hashing, rehashing.
6.	Heaps: Binary heaps, applications, d-heaps.
7.	Leftist heaps, skew heaps, binomial queues
8.	Sorting: insertion sort, shell sort, heap sort
9.	Merge sort, quick sort, bucket sort, external sort
10	Graphs: Shortest path algorithms, network flow problem, minimum spanning tree

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Mark Allen Weiss: Data Structure & Algorithm Analysis in C SECOND EDITION: Addison -Wesley publishing
2. Thomas H. Cormen, Charles E. Leiserson & Ronald L. Rivest: Introduction to Algorithms. Prentice- Hall of India Pvt. Limited, New Delhi
3. Kruse, Data Structures & Program design, Prentice Hall of India, New Delhi.
4. Taenenbaum, Augenstein, & Langsam, Data Structures using C and C++, Prentice Hall of India, New Delhi.
5. Sorenson and Tremblay: An Introduction to Data Structures with Algorithms.
6. Author: Seymour Lipschutz, Title: Schaum Outline Series, Publishers: Tata McGraw Hill, New Delhi, Year of Publication: 2006

Course Code:	D	C	A	P	6	0	6	Course Title:	BUSINESS INTELLIGENCE
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WEIGHTAGE	
CA	ETE(Th.)
20	80

COURSE CONTENTS:

S. No.	Topics
1.	Business Intelligence: Introduction, Meaning, Purpose and Structure of Business Intelligence Systems. Understanding Multidimensional Analysis Concepts: Attributes, Hierarchies and Dimensions in data Analysis. Understanding Dimensional Data warehouse: Fact Table, Dimension Tables, Surrogate Keys and alternative Table Structure. What is multi dimension OLAP?
2.	Understanding OLAP: Fast response, Meta-data based queries, Spread sheet formulas. Understanding Analysis Services speed and meta data. Microsoft’s Business intelligence Platform. Analysis Services Tools. Data Extraction, Transformation and Load. Meaning and Tools for the same.
3.	Creating your first Business Intelligence Project. Creating Data source, Creating Data view. Modifying the Data view. Creating Dimensions, Time, and Modifying dimensions. Parent-Child Dimension.
4.	Creating Cube: Wizard to Create Cube. Preview of Cube. Adding measure and measure groups to a cube. Calculated members. Deploying and Browsing a Cube.
5.	Advanced Measures and Calculations: Aggregate Functions. Using MDX to retrieve values from cube. Calculation Scripting. Creation of KPI’s.
6.	Advanced Dimension Design: Creating reference, fact and many to many dimensions. Using Financial Analysis Cubes. Interacting with a cube. Creating Standard and Drill Down Actions.
7.	Retrieving data from Analysis Services: Creating Perspectives, MDX Queries, Excel with Analysis Services.
8.	Data mining: Meaning and purpose. Creating data for data mining. Data mining model creation. Selecting data mining algorithm. Understanding data mining tools. Mapping Mining Structure to Source Data columns. Using Cube Sources. Configuring Algorithm parameters.
9.	Creating Data mining queries and reports. Creation of Prediction queries. Understanding DMX language.
10.	Reporting Tools: Using SQL Server Reporting Services to develop reports for analysis services.

READINGS: SELF LEARNING MATERIAL

ADDITIONAL READINGS:

1. “Microsoft SQL Server 2008 Analysis Services”, Scott Cameron. Microsoft Press. (2009)
2. “SQL Server 2008 Business Intelligence Development and Maintenance”, Erric Veerman. Microsoft Press (For Data Mining only)
3. Business intelligence a managerial approach. Turban E, Sharda R, Aronson J.E. and King D.(2007). Prentice Hall
4. Mike Biere, Business Intelligence for the Enterprises, Prentice Hall, 2003.
5. Larissa T. Moss and Shaku Atre, Business Intelligence Roadmap: The complete Project Lifecycle for decision support Application, Addison-Wessly 2003.
6. Decision support and Data Warehousing systems Mallach E.G(2000). McGraw Hill.

Course Code:	D	C	A	P	6	0	7	Course Title:	WIRELESS NETWORKS
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WEIGHTAGE	
CA	ETE(Th.)
20	80

COURSE CONTENTS:

S. No.	Topics
1.	Introduction to Wireless Networks. IEEE Standards for Wireless Networks. Wireless Networks Applications. Types of Wireless Networks. Benefits of Wireless Networks.
2.	Wireless System Architecture: Wireless System Components, Network Architecture. Information Signals. Radio Frequency and Light Signal Fundamentals: Wireless Transceivers, understanding RF Signals, Working of Light Signals, Modulation: Sending Data packets in the Air.
3.	Types of Wireless Networks: WPAN, WLAN, WMAN Wireless PAN: Components: User Devices, Radio NIC, USB Adapters, Wireless Routers, Bluetooth Dongles etc. Wireless PAN Systems: SOHO Equipments, Printing, Accessing Internet, Accessing PDA's, Mobile Phones Wireless PAN Technologies: IEEE 802.15. Bluetooth Version 1 and Version 2.
4.	Wireless LAN: Meaning, Components: User Devices, Radio NIC's, Access Points, Routers, Repeaters, And Antennae. SOHO Applications: Internet Access, Printing, Remote Accessing. Public Wireless LAN's, and AdHoc Wireless LAN's
5.	Wireless MAN: Meaning and Components: Bridges, Bridges Vs. Access Points, Ethernet to Wireless Bridges, Workgroup Bridges, Directional Antennae's, Semi-Directional, Polarization.
6.	Wireless MAN Systems: Point to Point Systems, Point to Multi Point, Packet Radio Systems. Wireless MAN Technologies: IEEE 802.11 and Wi-Fi and also purpose of IEEE 802.16 Standard
7.	Wireless WAN: WAN User Devices, Base Stations, Antennae. Wireless WAN Systems: Cellular-Based Wireless WANs, First-Generation Cellular, Second-Generation Cellular, Third-Generation Cellular, SMS Application.
8.	Space-Based Wireless WANs: Satellites, Meteor Burst Communications
9.	Wireless Networks Security: Security Threats, Traffic Monitoring, Unauthorized Access, Middle Attacks, DoS Attack (Denial of Service). Protective Actions: WEP, WEP issues, WPA, VPN.
10.	Authentication. 802.11 Authentication Vulnerabilities, MAC Filters, Authentication Using Public Key Cryptography, 802.1x, Security Policies.

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Wireless Networks First Step, By: Jim Geier, CISCO Press.
2. Principles of Wireless Networks by Kaveh Pahlavan, Pearson Education.
3. Wireless Communication & Networks by William Stallings, Pearson Education.
4. 802.11 Wireless Networks: The definitive Guide by Mathew Gaust, o'Reilly.
5. Building Wireless Community Network by Fringer, o'Reilly.

Course Code:	D	C	A	P	6	0	8	Course Title:	REAL TIME SYSTEMS
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WEIGHTAGE	
CA	ETE(Th.)
20	80

COURSE CONTENTS:

S. No.	Topics
1.	Introduction to real time Applications: Digital Control, High Levels Control, Signal Processing, Other Real Time Applications.
2.	Hard Versus Soft Real-Time System: Jobs and Processors, Release Time, Deadline and Timing constraints, Hard and Soft Timing constraints, Hard real time systems, Soft real time systems.
3.	A Reference Model of Real Time System: Processors and Resources, Temporal Parameters of real time model, Precedence constraints and data dependencies.
4.	Other Types of dependences, Functional parameters, Resource parameters of jobs and parameters of resources, scheduling hierarchy.
5.	Commonly used Approaches to Real Time Scheduling: Clock-Driven approach, Weight Round-Robin Approach, Priority-Driven Approach, Dynamic versus Static system, Effective Release Times and Deadlines.
6.	Commonly used Approaches to Real Time Scheduling: Optimality of the EDF and LST Algorithm, Nonoptimality of the EDF and the LST Algorithm, Challenges in validating Timing Constraints in Priority-Driven System, Off-Line versus On -Line Scheduling.
7.	Clock-Driven Scheduling: Notations and Assumptions, Static, Timer-Driven Scheduler, General Structure of Cyclic Scheduler, Cyclic Scheduling.
8.	Clock-Driven Scheduling: Improving the Average Response Time of Aperiodic jobs, Scheduling Sporadic Jobs, Practical Consideration and Generalizations, Algorithm for Constructing Static Schedules, Pros and Cons of Clock Driven Scheduling.
9.	Priority Driven Scheduling of Periodic Tasks: Static Assumptions, Fixed Priority versus Dynamic Priority Algorithms, Maximum Schedulable Utilization, Optimality of the RM and DM Algorithms, A Schedulability Test for Fixed-Priority Tasks with Short Response Time.
10.	Priority Driven Scheduling of Periodic Tasks: Schedulability Test for Fixed--Priority Tasks with Arbitrary Response Time, Sufficient Schedulability conditions for the RM and DM Algorithm, Practical Factors

READINGS: SELF LEARNING MATERIAL.

ADDITIONAL READINGS:

1. Jane W.S.Liu, Real Time System, Pearson Education, 2008.
2. Alan, C. Shaw, RTS and software, John Wiley and Sons, New York, 2001.
3. Philip Laplante, Real-time systems design and analysis, an engineer's handbook, IEEE Computer Society Press, New York.
4. J.E. Cooling, Software Design for Real-time Systems, Chapman and Hall, New York.
5. Hassan Gomaa, Software Design Methods for Concurrent and Real-time Systems, Addison-Wesley, Massachusetts.

Course Code:	D	C	A	P	6	0	9	Course Title:	CLOUD COMPUTING
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WEIGHTAGE	
CA	ETE(Th.)
20	80

COURSE CONTENTS:

S. No.	Topics
1.	Understanding Cloud Computing: Cloud Computing, History of Cloud Computing, Cloud Architecture, Cloud Storage, Why Cloud Computing Matters
2.	Understanding Cloud Computing: Advantages of Cloud Computing , Disadvantages of Cloud Computing, Companies in the Cloud Today, Cloud Services
3.	Developing Cloud Services: Web-Based Application, Pros and Cons of Cloud Service Development, Types of Cloud Service Development, Software as a Service, Platform as a Service.
4.	Developing Cloud Services: Web Services, On-Demand Computing, Discovering Cloud Services Development Services and Tools, Amazon Ec2, Google App Engine, IBM Clouds
5.	Cloud Computing for Everyone: Centralizing Email Communications, Collaborating on Schedules, Collaborating on To-Do Lists, Collaborating Contact Lists, Cloud Computing for the Community, Collaborating on Group Projects and Events, Cloud Computing for the Corporation
6.	Using Cloud Services: Collaborating on Calendars, Schedules and Task Management, Exploring Online Scheduling Applications, Exploring Online Planning and Task Management,
7.	Using Cloud Services: Collaborating on Event Management, Collaborating on Contact Management, Collaborating on Project Management, Collaborating on Word Processing, Collaborating on Databases, Storing and Sharing Files
8.	Other ways to collaborate Online: Collaborating via Web-Based Communication Tools, Evaluating Web Mail Services, Evaluating Web Conference Tools, Collaborating via Social Networks and Groupware, Collaborating via Blogs and Wikis

READINGS: SELF LEARNING MATERIAL

ADDITIONAL READINGS:

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
2. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.