University of Pune
(Pattern – 2013) w.e.f. 2014 – 15

B.C.A. Semester III

Subject Name-: RDBMS (Relational Database Management System)
Course Code-: 301

Objectives:

1. Enables students to understand relational database concepts and transaction management concepts in database system.
2. Enables student to write PL/SQL programs that use: procedure, function, package, cursor and trigger.

Unit	Topic	No. of Lectures	Ref. Book
Unit 1	**Introduction To RDBMS** 1.1 Introduction to popular RDBMS product and their features 1.2 Difference Between DBMS and RDBMS 1.3 Relationship among application programs and RDBMS	**2**	1
Unit 2	**PLSQL** 2.1 Overview of PLSQL 2.2 Data Types 2.3 PLSQL Block 2.3.1 % type, % rowtype 2.3.2 Operators, Functions, comparison, numeric, character, date 2.3.3 Control Statement 2.4 Exception Handling 2.4.1 Predefined 2.4.2 User defined exceptions 2.5 Functions , Procedures 2.6 Cursor 2.6.1 Definition 2.6.2 Types of cursor- implicit, explicit (attributes) 2.6.3 Parameterized cursor 2.7 Trigger 2.8 Package	**20**	4
Unit 3	**Transaction Management** 3.1 Transaction Concept 3.2 Transaction Properties 3.3 Transaction States 3.4 Concurrent Execution 3.5 Serializability 3.5.1 Conflict Serializability 3.5.2 View Serializability 3.6 Recoverability	**10**	1,2,3

	3.6.1 Recoverable Schedule 3.6.2 Cascadless Schedule		
Unit 4	**Concurrency Control** 4.1 Lock Based Protocol 4.1.1 Locks 4.1.2 Granting of Locks 4.1.3 Two Phase Locking Protocol 4.2 Timestamp Based Protocol 4.2.1 Timestamp 4.2.2 Timestamp ordering protocol 4.2.3 Thomas's Write Rule 4.3 Validation Based Protocol 4.4 Deadlock Handling 4.4.1 Deadlock Prevention 4.4.2 Deadlock Detection 4.4.3 Deadlock Recovery	**8**	1,2,3
Unit 5	**Recovery System** 5.1 Failure Classification 5.1.1 Transaction Failure 5.1.2 System Crash 5.1.3 Disk Failure 5.2 Storage Structures 5.2.1 Storage Types 5.2.2 Data Access 5.3 Recovery & Atomicity 5.3.1 Log based Recovery 5.3.2 Deferred Database Modification 5.3.3 Immediate Database Modification 5.3.4 Checkpoints 5.4 Recovery with Concurrent Transaction 5.4.1 Transaction Rollback 5.4.2 Restart Recovery 5.5 Remote Backup System	**8**	1,2,3
Total No. of Lectures		**48**	

Recommended Books :

1) Database System Concepts 5th Edition - Silberschatz, Korth, Sudershan.

2) Database Management System - Bipin Desai

3) An Introduction to Database Systems Eighth Edition C. J.Date, A.Kannan, S.Swamynathan

4) SQL/PLSQL the programming language of oracle - Ivan Bayross

B.C.A. Semester III

Subject Name -: Data Structure Using C

Course Code -:302

Objective:-

1. To understand different methods of organising large amounts of data
2. To efficiently implement different data structure
3. To efficiently implement solution for different problems
4. To get more knowledge on C programming language

Unit	Topic	No. of Lectures	Reference Books
Unit 1	**Basic Concept and Introduction to Data Structure** 1.1 Pointers and dynamic memory allocation 1.2 Algorithm-Definition and characteristics 1.3 Algorithm Analysis -Space Complexity -Time Complexity -Asymptotic Notation **Introduction to Data structure** 1.5 Types of Data structure 1.6 Abstract Data Types (ADT) **Introduction to Arrays and Structure** 1.7 Types of array and Representation of array 1.8 Polynomial - Polynomial Representation - Evaluation of Polynomial - Addition of Polynomial 1.9 Self Referential Structure	**9**	1,2
Unit 2	**Searching and Sorting Techniques**	**9**	1,2,3

	2.1 Linear Search 2.2 Binary Search(Recursive , Non-Recursive) 2.3 Bubble Sort 2.4 Insertion Sort 2.5 Selection Sort 2.6 Quick Sort 2.7 Heap Sort (No Implementation) 2.8 Merge Sort 2.9 Analysis of all Sorting Techniques		
Unit 3	**Linked List** 3.1 Introduction 3.2 Static & Dynamic Representation 3.3 Types of linked List - Singly Linked list(All type of operation) - Doubly Linked list (Create , Display) - Circularly Singly Linked list (Create, Display) 3.4 Circularly Doubly Linked list (Create, Display)	**10**	1,3
Unit 4	**Stack and Queue** 4.1 Introduction stack 4.2 Static and Dynamic Representation 4.3 Primitive Operations on stack 4.4 Application of Stack 4.5 Evaluation of postfix and prefix expression 4.6 Conversion of expressions- Infix to prefix & Infix to postfix **Queue** 4.7 Introduction queue 4.8 Static and Dynamic Representation 4.9 Primitive Operations on Queue	**9**	1,2,3

	4.10 Application of Queue 4.11 Type of Queue Circular Queue De Queue Priority Queue		
Unit 5	**Trees** 5.1 Introduction & Definitions 5.2 Terminology 5.3Static and Dynamic Representation 5.4 Types of tree 5.5 Operations on Binary Tree & Binary Search Tree 5.6 Tree Traversal Inorder, Preorder, Postorder (Recursive & Iterative) 5.7.AVL Tree	**7**	1,2
Unit 6	**Graphs** 6.1Representation -Adjacency Matrix -List 6.2 In degree , out degree of graph 6.3 Graph operation DFS , BFS 6.4 Spanning Tree	**4**	1,2,3
	Total No. of Lectures	**48**	

Recommended Books:-

1. Fundamentals of data structures – Ellis Horowitz and Sartaj Sahni

2. Data Structure Using C - Radhakrishanan and Shrivastav.

3. Data Structure Using C and C++ - Rajesh K. Shukla ,Wiley -India

4. Data Structures Files and Algorithms – Abhay K. Abhyankar

5. Data Structures and Algorithms – Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman (PearsonEducation)

B.C.A.Semester III

Subject Name -: Introduction to Operating System
Course Code -: 303

Objective -:

1. To know system programming
2. To know services provided by operating system
3. To know the Scheduling concepts

Unit	Topic	No. of Lect.	Reference Books
Unit 1	**Introduction to Operating System** 1.1 What is operating system 1.2 Computer system architecture 1.3 Services provided by OS 1.4 Types of OS	02	Book 1,2
Unit 2	**System Structure** 2.1 User operating system Interface 2.2 System Calls 2.3 Process or job control 2.4 Device Management 2.5 File Management 2.6 System Program 2.7 Operating System Structure	02	Book 2
Unit 3	**Process Management** 3.1 What is Process 3.2 Process State 3.3 Process Control Block 3.4 Context Switch 3.5 Operation on Process Process Creation Process Termination	03	Book 2
Unit 4	**CPU Scheduling** 4.1 What is scheduling 4.2 Scheduling Concepts 4.2.1 CPU- I/O Burst Cycle 4.2.2 CPU Scheduler 4.2.3 Preemptive and Non-preemptive scheduling 4.2.4 Dispatcher 4.3 Scheduling criteria (Terminologies used in scheduling) 4.4 Scheduling Algorithms 4.4.1 FCFS 4.4.2 SJF (Preemptive & non-preemptive) 4.4.3 Priority Scheduling (Preemptive & Non-preemptive) 4.4.4 Round Robin Scheduling 4.5 Multilevel Queues	08	Book 2

	4.6 Multilevel Feedback queues		
Unit 5	**Process Synchronization** 5.1 Introduction 5.2 Critical section problem 5.3 Semaphores 5.3.1 Concept 5.3.2 Implementation 5.3.3 Deadlock & Starvation 5.3.4 Binary Semaphores 5.4 Critical Sections 5.5 Classical Problems of synchronization 5.6 Bounded buffer problem 5.7 Readers & writers problem 5.8 Dining Philosophers problem	06	Book 2
Unit 6	**Deadlock** 6.1 Introduction 6.2 Deadlock Characterization 6.3 Necessary Condition 6.4 Resource allocation graph 6.5 Deadlock Prevention 6.6 Deadlock Avoidance Safe State Resource allocation graph algorithm Bankers algorithm 6.7 Deadlock Detection 6.8 Recovery from deadlock Process Termination Resource Preemption	07	Book 2
Unit 7	**Memory Management** 7.1Introduction to memory management 7.2 Address Binding 7.3 Dynamic Loading 7.4 Dynamic Linking 7.5 Overlays 7.6 Logical vs. physical addresses 7.7 Swapping 7.8 Contiguous memory allocation 7.8.1 Single Partition Allocation 7.8.2 Multiple Partition Allocation 7.8.3 External and Internal Fragmentation 7.9 Paging 7.10 Segmentation 7.11 Segmentation with paging 7.12 Virtual memory 7.13 Demand paging 7.14 Page replacement algorithms FIFO MRU	08	Book 2

	LRU LRU approximation using reference bit MFU LFU Second Chance algorithm Optimal replacement		
Unit 8	**File System** 8.1 Introduction & File concepts (file attributes, Operations on files) 8.2 Access methods Sequential access Direct access 8.3 File structure Allocation methods Contiguous allocation Linked Allocation Indexed Allocation 8.4 Free Space Management Bit Vector Linked List Grouping Counting	07	Book 2
Unit 9	**I/O System** 9.1 Introduction 9.2 I/O Hardware 9.3 Application of I/O Interface 9.4 Kernel I/O Subsystem 9.5 Disk Scheduling FCFS Shortest Seek time first SCAN C- SCAN C- Look	05	Book 2
	Total No. of Lectures	**48**	

Recommended Books

1. System Programming and Operating System – D. M. Dhamdhere

2. Operating System Concepts – Silberschatz, Galvin, Gagne

BCA Semester-III
Subject Name: - Business Mathematics
Course Code: - 304

Unit No	Topic	No of Lectures
Unit 1	**Ratio, Proportion and Percentage**Ratio- Definition, Continued Ratio, Inverse Ratio, Proportion, Continued Proportion, Direct Proportion, Inverse Proportion, Variation, Inverse Variation, Joint Variation, Percentage- Meaning and Computations of Percentages.	**08**
Unit 2	**Profit And Loss**Terms and Formulae, Trade discount, Cash discount, Problems involving cost price, Selling Price, Trade discount and Cash Discount. Introduction to Commission and brokerage, Problems on Commission and brokerage.	**08**
Unit 3	**Interest** Simple Interest, Compound interest (reducing balance & Flat Interest rate of interest), Equated Monthly Installments(EMI), Problems	**06**
Unit 4	**Matrices And Determinants (upto order 3 only)**Multivariable data, Definition of a Matrix, Types of Matrices, Algebra of Matrices, Determinants, Ad joint of a Matrix, Inverse of a Matrix via ad joint Matrix, Homogeneous System of Linear equations, Condition for Uniqueness for the homogeneous system, Solution of Non-homogeneous System of Linear equations (not more than three variables). Condition for existence and uniqueness of solution, Solution using inverse of the coefficient matrix, Problems.	**14**
Unit 5	**Linear Programming problem (L.P.P.)** Meaning of LPP, Formulation of LPP, and solution by graphical methods.	**04**
Unit 6	**Transportation problem (T.P.)**Statement and meaning of T.P. methods of finding initial basic feasible solution by North West corner Rule, Matrix Minimum method and Vogel's approximation method. Simple numerical problems (concept of degeneracy is not expected).	**08**
	Total no of lectures	**48**

Reference Books:

1) Business Mathematics by Dr. Amarnath Dikshit & Dr. Jinendra Kumar Jain.

2) Business Mathematics by V. K. Kapoor - Sultan chand & sons, Delhi

3) Business Mathematics by Bari - New Literature publishing company, Mumbai

4) Operations Research by Dr. S. D. Sharma – Sultan Chand & Sons.

5) Operations Research by Dr. J. K. Sharma – Sultan Chand & Sons.

B.C.A. Semester III

Subject Name-: Software Engineering
Course Code-: 305

Course Objective: This course enables students to understand system concepts and its application in Software development.

Unit	Name of the Topic	Number of lecturer	Reference Book
Unit 1	**Introduction to System Concepts** 1.1 Definition , Elements of System 1.2 Characteristics of System 1.3 Types of System 1.4 System Concepts	6	Book1
Unit 2	**Requirement Analysis** 2.1 Definition of System Analysis 2.2 Requirement Anticipation 2.3 Knowledge and Qualities of System Analyst 2.4 Role of a System Analyst 2.5 Feasibility Study And It's Types 2.6 Fact Gathering Techniques 2.7 SRS(System Requirement Specification)	8	Book1
Unit 3	**Introduction to Software Engineering** 3.1 Definition Need for software Engineering 3.2 Software Characteristics 3.3 Software Qualities (McCall's Quality Factors	6	Book2
Unit 4	**Software Development Methodologies** 4.1 SDLC (System Development Life Cycle) 4.2 Waterfall Model 4.3 Spiral Model 4.4 Prototyping Model 4.5 RAD MODEL	6	Book2
Unit 5	**Analysis and Design Tools** 5.1 Entity-Relationship Diagrams 5.2 Decision Tree and Decision Table 5.3 Data Flow Diagrams (DFD) 5.4 Data Dictionary 5.4.1 Elements of DD 5.4.2 Advantage of DD 5.5 Pseudo code 5.6 Input And Output Design 5.7 CASE STUDIES (Based on Above Topic)	10	Book1, Book2

Unit 6	**Structured System Design** 6.1 Modules Concepts and Types of Modules 6.2 Structured Chart 6.3 Qualities of Good Design 6.3.1 Coupling, Types of Coupling 6.3.2 Cohesion, Types of Cohesion	6	Book1 and Book2
Unit 7	**Software Testing** 7.1 Definition, Test characteristics 7.2 Types of testing 7.2.1 Black-Box Testing 7.2.2 White-Box Testing 7.2.3 Unit testing 7.2.4 Integration testing 7.3 Validation 7.4 Verification	6	Book1 and Book2
	Total No. of Lectures	**48**	

Recommended Books :

1) Software Engineering - Roger s. Pressman.

2) SADSE (System Analysis Design) - Prof. Khalkar and Prof. Parthasarathy.

B.C.A. Semester IV
Subject Name-: Object Oriented Programming Using C++
Course Code-: 401

Objectives:
1. Acquire an understanding of basic object-oriented concepts and the issues involved in effective class design.
2. Enables student to write C++ programs that use: object-oriented concepts such as information hiding, constructors, destructors, inheritance.

Unit	Topic	No. of Lectures	Ref. Book
Unit 1	**Introduction to C++** 1.1 Basic concepts of OOP, benefits, applications of OOP 1.2 A simple C++ program 1.3 Structure of C++ program 1.4 Creating a source file, compiling and Linking	2	1
Unit 2	**Tokens, Expressions and Control structures** 2.1 Introduction 2.2 Tokens, keywords, Identifiers and constants 2.3 Data types - Basic, User defined and Derived 2.4 Symbolic constant 2.5 Type Compatibility 2.6 Variables - Declaration and Dynamic initialization 2.7 Reference variable 2.8 Operators in C++ 2.8.1 Scope resolution operator 2.8.2.Member Referencing operators 2.8.3Memory management operators 2.8.4 Manipulators 2.8.5 Type cast operators 2.9 Expression and their types 2.10 Special Assignment Expressions 2.11 Implicit conversions 2.12 Operator overloading introduction 2.13 Operator precedence 2.14 Control structures – if-else, do-while, for , switch	3	1,2,3
Unit 3	**Functions in C++** 3.1 Introduction 3.2 The main function 3.3 Function prototyping 3.4 Call by reference 3.5 Return by reference 3.6 Inline function – Making an outside function Inline 3.7 Arguments - default, constant 3.8 Math library functions	5	1,2,3

Unit 4	**Classes and Objects** 4.1 Introduction 4.2 Creating a class and objects 4.3 Defining member functions inside and outside class definition 4.4 Nesting of member functions 4.5 Private member functions 4.6 Arrays within a class 4.7 Memory allocation of objects 4.8 Static data members and static member functions 4.9 Array of objects 4.10 Objects as function arguments 4.11 Friend functions 4.12 Returning objects 4.13 Constructors 4.14 Types of constructor 4.15 Destructors	10	1,2
Unit 5	**Inheritance** 5.1 Introduction 5.2 Base class and derived class examples 5.3 Types of Inheritance 5.4 Virtual base class 5.5 Abstract class 5.6 Constructors in derived class	9	1,2
Unit 6	**Polymorphism** 6.1 Compile Time Polymorphism 6.1.1 Function overloading 6.1.2 Operator Overloading Introduction 6.1.3 Overloading unary and binary operator 6.1.4 Overloading using friend function 6.1.5 Overloading insertion and extraction operators 6.1.6 String manipulation using operator overloading 6.2 Runtime Polymorphism 6.2.1 this Pointer, pointers to objects, pointer to derived classes 6.2.2 Virtual functions and pure virtual functions	8	1,2
Unit 7	**Managing console I/O operations** 7.1 Introduction 7.2 C++ streams and C++ stream classes 7.3 Unformatted I/O operations 7.4 Formatted console I/O operations 7.5 Managing output with manipulators	3	1,2
Unit 8	**Working with Files** 8.1 Classes for File Stream operations 8.2 File operations - Opening, Closing and updating 8.3 Error handling during File operations 8.4 Command Line arguments	5	1
Unit 9	**Templates** 9.1 Introduction 9.2 Class Templates	3	1

	9.3 Function Templates 9.4 Exception Handling(Introduction)		
	Total No. of Lectures	**48**	

Recommended Books :

1) Object oriented programming with C++ - by E Balagurusamy
2) Object Oriented Programming with C++ by Robert Lafore
3) Object Oriented Programming in C++ by Dr. G. T. Thampi, Dr. S. S. Mantha, DreamTech Press

B.C.A. Semester IV

Subject Name: Programming in Visual Basic
Course Code: 402

Objectives:-

To learn properties and events, methods of controls and how to handle events of different controls.To understand the use of active controls and how to design VB application
To learn connectivity between VB and databases**.**

Unit No	Topic	No. of Lectures	Ref .Book
Unit 1	**Getting started with V. B.** 1.1 Object Oriented Concept 1.2 Event Driven Programming Language 1.3 Working with properties 1.3.1 Studying the Events of a Form 1.3.2 Working code for events 1.3.3 Planning the Design	**4**	**1,3**
Unit 2	**Constants, Variables , Operators, Control Structure, Looping & Array** 2.1Constant 2.2 Data Types 2.2.1 Number , long ,Boolean ,doubles ,variant, String 2.2.2 User defined data types 2.3Variables 2.4 Operators 2.5Control Structures 2.5.1 If 2.5.2 If….Else 2.5.3 Nested If….Else 2.5.4 Select Case 2.6 Looping 2.6.1 Do Loop 2.6.2 While Loop 2.6.3 Until Loop 2.6.4 For Loop 2.6.5 With Statement 2.7 Array 2.7.1 Single Dimensional Array 2.7.2 Multidimensional Array 2.7.3 Control Array 2.8 Functions(Built in and user defined)	**10**	**1,2,3**
Unit 3	**Working with Controls** 4.1 Adding controls on form 4.2 Working with Properties and Methods of each Controls 4.3 Creating an application 4.4 Creating MDI application	**10**	

	4.4.1 Working with Multiple Forms 4.4.2 Loading, Showing & Hiding Forms 4.4.3 Setting the Startup form 4.4.4 Creating forms in Code 4.4.5 Using the MDI 4.4.6 Arranging MDI Child Window 4.4.7 Opening new MDI child window 4.4.8 Creating Properties in a form 4.4.9 Creating a method in a form		**2,3**
Unit 4	**<u>Working with ActiveX Controls & Menus</u>** 4.1 Creating Status Bar For your program 4.2 Working with Progress Bar 4.3 Working with Toolbar 4.4 Setting up the Image List Controls 4.4.1 Adding and Deleting Images with code 4.4.2 Study of Different Dialog Boxes 4.5 Menus 4.5.1 Creating new Menu Item 4.5.2 Modifying & Deleting Menu Item 4.5.3 Adding Access Characters 4.5.4 Adding Shortcut Keys 4.5.5 Creating Sub Menus 4.6 Pop-up Menus 4.6.1 Creating pop-up menu 4.6.2 Displaying pop-up menu 4.7 Adding & Deleting Menus At Run-time 4.8 Adding Menu Items for MDI Child Form	**12**	**1,2,3**
Unit 5	**<u>Working With Database</u>** 5.1 Data Control 5.1.1 Studying the Properties and methods of Data Control 5.1.2 Connectivity with MS-Access 5.1.3 Operations of database through coding 5.2 ADO Data Control 5.2.1 Advantages of ADODC over DC 5.2.2 Studying the properties and Methods of ADODC 5.2.3 Connectivity with MS-Access 5.2.4 Connectivity with Oracle 5.2.5 Report Generation 5.3 Developing ADO application through ADODC and coding 5.4 Report Generation	**12**	**2,3**
	Total No. of Lectures	**48**	

Recommended Books :

1) Mastering Visual Basic

2) Visual Basic Black Book

3) Learn VB in 21 days

B. C. A. Semester IV

Subject Name : Computer Networking
Course Code :- 403

Objective :-

1. To know about computer network.
2. To understand different topologies used in networking
3. To learn different types of network.
4. To understanding the use of connecting device used in network.

Unit No.	Topic	No. of Lectures	Ref. Books
Unit 1	**Basics of Computer Networks** 1.1 Computer Network 1.1.1 Definition 1.1.2 Goals 1.1.3 Applications 1.1.4 Structure 1.1.5 Components 1.2 Topology 1.2.1 Bus 1.2.2 Star 1.2.3 Ring 1.2.4 Mesh 1.3 Types of Networks 1.3.1 LAN, MAN, WAN, Internet 1.3.2 Broadcast & Point-To-Point Networks 1.4 Communication Types 1.4.1 Serial 1.4.2 Parallel 1.5 Modes of Communication : 1.5.1 Simplex 1.5.2 Half Duplex 1.5.3 Full Duplex 1.6 Server Based LANs & Peer-to-Peer LANs 1.6.1 Comparison of both 1.7 Protocols and Standards	8	1,2,3
Unit 2	**Network Models** 2.1 Design issues of the layer 2.2 Protocol Hierarchy 2.3 ISO-OSI Reference Model : 2.3.1 Layers in the OSI Model 2.3.2 Functions of each layer 2.4 Terminology 2.4.1 SAP 2.4.2 Connection Oriented services 2.4.3 connectionless services	8	1,2,3

	2.4.4 Peer Entities 2.5 Internet Model (TCP/IP) 2.6 Comparison of ISO-OSI & TCP/IP Model 2.7 Addressing 2.7.1 Physical Addresses 2.7.2 Logical Addresses 2.7.3 Port Addresses 2.8 IP Addressing 2.8.1 Classful addressing 2.8.2 Classless addressing		
Unit 3	**Transmission Media** 3.1 Guided Media(Wired) : 3.1.1 Coaxial Cable:- Physical Structure, Standards, BNC Connector, Applications 3.1.2 Twisted Pair :- Physical Structure, UTP vs STP, Connectors, Applications 3.1.3 Fiber Optics Cable :- Physical Structure, Propagation Modes (Single Mode & Multimode), Connectors, Applications 3.2 Unguided Media(Wireless) 3.2.1 Electromagnetic Spectrum For Wireless Communication 3.2.2 Propagation Methods 3.2.2.1 Ground, 3.2.2.2 Sky, 3.2.2.3 Line-Of-Sight 3.3.3 Wireless Transmission 3.3.3.1 Radio Waves 3.3.3.2 Infra-Red, 3.3.3.3 Micro-Wave	10	1,2,3
Unit 4	**Wired and Wirless LANs** 4.1 IEEE Standards 4.2 Standard Ethernet 4.2.1 MAC Sublayer 4.2.2 Physical layer 4.3 Fast Ethernet 4.3.1 MAC Sublayer 4.3.2 Physical layer 4.4 Gigabit Ethernet 4.4.1 MAC Sublayer 4.4.2 Physical layer 4.5 Network Interface Cards(NIC) 4.5.1 Components of NIC 4.5.2 Functions of NIC 4.5.3 Types of NIC 4.6 Wireless LAN 4.6.1 IEEE802.11 Architecture 4.6.2 MAC Sub layer 4.6.3 Frame Format	10	1,2,3

	4.6.4 Frame Types 4.6.5 Addressing Mechanism 4.6.6 Bluetooth (Architecture, Piconet and Scatternet, Applications)		
Unit 5	**Network Connectivity Devices** 5.1 Categories of Connectivity Devices 5.1.1 Passive & Active Hubs 5.1.2 Repeaters 5.1.3 Bridges 5.1.3.1 Transparent Bridges(Loop Problem, Spanning Tree) 5.1.3.2 Source Routing Bridges 5.1.4 Switches 5.1.5 Router 5.1.6 Gateways 5.2 Network Security Devices 5.2.1 Firewalls 5.2.1.1 Packet-Filter firewall 5.2.1.2 Proxy firewall	6	1,2,3
Unit 6	**Internet Basics** 6.1 Concept of Intranet & Extranet 6.2 Internet Information Server(IIS) 6.3 Web Server 6.4 World Wide Web(WWW) 6.4.1 Architecture, 6.4.2 Web Documents :- static, dynamic and active documents 6.5 Search Engines 6.6 Internet Service Providers(ISP) 6.7 HTTP 6.7.1 HTTP Transaction 6.7.2 Persistent and non persistent connection	6	2,3
Total No. of Lectures		**48**	

Recommended Books :

1) Computer Networks - Andrew Tanenbaum (III Edition)

2) Data Communications & Networking - Behrouz Ferouzan (III Edition)

3) Complete Guide to Networking - Peter Norton

B.C.A. Semester IV

Subject Name -: Enterprise Resource Planning and Management.
Course Code -:404

Objectives -:

1. To know what is ERP.
2. To learn different ERP technologies.

Unit No.	Topic	No. of Lect.	Reference Books
Unit 1	**ERP : An Overview** 1.1. What is ERP. 1.2. Reasons for Growth Of ERP 1.3. Problem areas in ERP implementations. 1.4. The future of ERP 1.5. Characteristics and features of ERP 1.6. Benefits of ERP.	**04**	**1,2**
Unit 2	**Enterprise Modeling and Integration for ERP** 2.1.Enterprise-An overview 2.2.What is enterprise 2.3.Integrated Management Information 2.4.The role of enterprise 2.5.Business modeling 2.6.Integrated Data Model 2.7.Role of Common/Shared Enterprise Database 2.8.Linkages of the Enterprise 2.8.1.Establishing Customer-Enterprise Link 2.8.2.Establishing Vendor-Enterprise Link 2.8.3.Establishing Links within the Enterprise 2.8.4.Establishing Links with Environment 2.9. Scope of Enterprise system 2.10.Generic Model of ERP System 2.11.Client/Server Architecture and Enterprise – wide Computing 2.11.1. Characteristics of client/Server Architecture 2.11.2. Different Components of ERP Client/Server Architecture	**08**	**1,2**
Unit 3	**ERP And related Technologies** 3.1.BPR(Business Process reengineering) 3.1.1.Definition 3.2.BPR –The different phases 3.3.Enterprise Redesign Principles 3.4.BPR and IT 3.5.Data Warehousing 3.6.Data Warehouse Components	**08**	**1,2**

	3.7.Structure and Uses of Data Warehouse 3.8.Data Mining 3.9.What Is Data Mining 3.10.Data Mining Process 3.11.Advantages and Technologies Used In Data Mining 3.12.OLAP 3.13.Supply Chain Management 3.13.1.Definition 3.13.2.Stevan's Model 3.13.3.Benefits 3.13.4.ERP Vs SCM 3.14.CRM		
Unit 4	**ERP Implementation** 4.1.Evolution 4.2.Evolution of ERP. 4.3.Evolution of Packaged Software Solutions. 4.4.The Obstacles in ERP implementation. 4.5.ERP Implementation Lifecycle (Different Phases). 4.6.Implementation Methodology. 4.7.ERP Implementation-The Hidden Costs. 4.8.In-house Implementation-Pros and Cons 4.9.Vendors and role of vendors for ERP 4.10.Consultants and role of consultants for ERP.	**08**	**1,2**
Unit 5	**Technologies In ERP System** 5.1.Introduction 5.2.Electronic Data Interchange(EDI) 5.2.1.Use of EDI 5.2.2.Evolution of EDI 5.2.3.Benefits of the EDI 5.2.4.EDI Standards 5.2.5.EDI Services 5.2.6.EDI Components 5.2.7.EDI Administration 5.3.IDoc Application 5.4.EDI Integration 5.5.ALE Integration 5.6.Internet Integration 5.7 OCR Integration	**07**	**2**
Unit 6	**The ERP Domain** 6.1.Vendors in the ERP Market. 6.2.SAP's Markets 6.2.1.SAP Architecture And Integration 6.2.2.Scalability of SAP 6.2.3.SAP Business Structure 6.2.4.Common SAP Installation 6.2.5.SAP R/3 System	**07**	**1,2**

	6.2.6.SAP Tools 6.3.Pepole Soft. 6.4.Jd Edwards 6.5.Oracle		
Unit 7	**ERP Present and Future** 7.1. Limitations of ERP 7.2. EIA(Enterprise Integration Application) 7.3. EIA Products 7.4. Two Flavors of EIA and Messaging 7.5. ERP And E-Commerce 7.6. ERP and Internet. 7.7. Future Directions in ERP.	**06**	**1**
	Total No. of Lectures	**48**	

Recommended Books

1. ERP : Demystified – Alexis Leon (Tata McGraw Hill)
2. ERP – Ravi Shankar and S. Jaiswal (Galgotia)

B.C.A .Semester IV

Subject: - Human Resource Management

Course Code:- 405

Objective: To acquaint the students with the Human Resource Management its different functions in an organization and the Human Resource Processes that are concerned with planning, motivating and developing suitable employees for the benefit of the organization.

Unit No.	Topic	No. of Lect.	Reference Books
Unit I	**Introduction To HRM** Definition and Concept of HRM and Personnel Management, Difference between PM and HRM, Importance of HRM, activities and functions of HRM, Challenges before HRM,HRD,HRP, Concept of recruitment –sources of recruitment. Concept of Selection –selection Procedure, Induction and placement	12	1,2,3,4
Unit II	**Performance Appraisal, Training and development** Meaning and Definition-need- objective –importance of training, training method –evaluation of training program, Concept and Objective Performance Appraisal-Process of performance appraisal method –uses and limitation of performance appraisal, Promotion and demotion policy, Transfer Policy**.**	12	1,2
Unit III	**Wages and Salary Administration** Method of wage payment –Employee Remuneration factors determining the level of remuneration-profit sharing –fringe benefit and employee services**.**	8	3,4
Unit IV	**Grievance and discipline** Meaning, Definition and nature of Grievance .Grievance procedure-Grievance Machinery. Definition of Discipline-aim and objective of discipline Principle of discipline.	8	1,2,3
Unit V	**The E-HR** Nature of E-HRM,E-HR activity, E-Recruitment , E-Selection, E-learning ,E-Compensation	8	2,4
	Total No. of Lectures	48	

Recommended Book:

1) P. C. Perdeshi – Human Resources Management.
2) K. Ashwathappa –Human Resources Management.
3) C. B. Mamoria – Personnel Management.
4) A. M. Sharma – Personnel and Human Resource Management.