

# SARDAR PATEL UNIVERSITY

## BCA

**Proposed Syllabus under CBCS**  
*(effective from June 2010)*

<b>SEMESTER-III</b>		
	<b>TITLE</b>	<b>NO. OF CREDITS</b>
<b>Core Courses</b>	<b>US03CBCA01</b> : Relational Database Management Systems-I	<b>4</b>
	<b>US03CBCA02</b> : Object Oriented Programming and C++	<b>4</b>
	<b>US03CBCA03</b> : Advanced Data and File Structures	<b>4</b>
	<b>US03CBCA04</b> : Practicals	<b>6</b>
<b>Foundation Courses</b>	<b>US03FBCA01</b> : Financial and Accounting Management	<b>4</b>
<b>Elective</b>	<b>US03EBCA01</b> : Introduction to Microprocessors	} <b>2</b>
	<b>US03EBCA02</b> : Introduction to Artificial Intelligence	
<b>Total Credits</b>		<b>24</b>

**BCA (III Semester)**  
**Course : US03CBCA01**  
**(Relational Database Management Systems-I)**

**Credits** : 4  
**Lectures per week** : 4

**All units carry equal weightage.**

**1. Introduction**

- The three-schema architecture for a Database Management System (DBMS)
- Introduction to data models (hierarchical, network, relational)
- Examples of current RDBMS products
- The relational data model: concepts and terminology, operations on data (DDL, DML), relationships and relationship types

**2. Relational Database Theory and Data Modeling**

- Integrity constraints
- Codd rules
- Entity-relationship modeling (different types of entities, attributes, relationships and their representation in the E-R diagram)
- Case studies of data modeling using E-R modeling

**3. Introduction to SQL**

- SQL - introduction , advantages and disadvantages
- Data types – built-in (number, char, varchar2, date, raw, long raw)
- Types of SQL Statements : DDL (Data Definition Language), DML (Data Manipulation Language), DCL (Data Control Language), TCL (Transaction Control Language)
- Working with SQL\*Plus – overview and basic commands like ed, start, get, save, exit, connect, set linesize, set pagesize and host
- Creating table and inserting data - CREATE TABLE, INSERT, retrieving data using query – SELECT , manipulating data – DELETE and UPDATE , modifying and removing table – ALTER TABLE and DROP TABLE.

**4. Data Constraints and Functions**

- Pseudo columns – ROWID, ROWNUM, USER, UID, SYSDATE
- Null values, TAB table, DUAL table
- Operators – arithmetic, relational, logical, range searching, pattern matching and set
- Data constraints – Introduction, advantages and disadvantages
- Type of data constraints – NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY and CHECK
- Modifying constraints, working with data dictionary and use of USER\_CONSTRAINTS
- Functions – introduction, merits and demerits, types of functions (scalar and aggregate)
- Scalar : Numeric functions (ABS, FLOOR, MOD, POWER, ROUND, SIGN, SQRT and TRUNC), Character functions (CHR, ASCII, CONCAT, INITCAP, LOWER, SUBSTR, TRIM, UPPER), Date functions (ADD\_MONTHS,

LAST\_DAY, NEXT\_DAY, MONTHS\_BETWEEN), Conversion functions (TO\_NUMBER, TO\_CHAR and TO\_DATE)

- Aggregate fun : AVG, COUNT, MAX, MIN, SUM
- Miscellaneous functions – NVL, DECODE, COALESCE

#### **5. Query, Subquery and Joins**

- Query and subquery, types of subquery
- Creation and manipulation of database objects – indexes, views, sequences and synonym
- Joining tables, types of joins (cross join, natural join, inner join, equijoin, outer joins, self join.

#### **6. Transaction Management and Reporting through SQL\*Plus**

- Data control language statements – GRANT and REVOKE
- Transaction control language statements – COMMIT, ROLLBACK and SAVEPOINT
- Overview of SQL\*Plus report
- Building a simple report
- Reporting commands – remark, setheadsep, ttitle, btitle, column, breakon, compute, spool, set pause.

#### **MAIN REFERENCE BOOKS :**

1. An introduction to Database Systems : Bipin C. Desai, Galgotia Publications Pvt. Ltd.
2. Ivan Bayross : SQL,PL/SQL The programming language of Oracle, 3<sup>rd</sup> revised edition, BPB Publications
3. Kevin Loney, George Koch, Oracle9i The Complete Reference , Oracle Press

#### **BOOKS FOR ADDITIONAL READING :**

1. Understanding Database Management System : S. Parthasarthy and B.W.Khalkar, First edition – 2007, Master Academy
2. P. S. Deshpande : SQL/PLSQL for Oracle9i, dreamtech press, reprint edition 2009

**Course : US03CBCA02**  
**(Object Oriented Programming and C++)**

**Credits** : 4

**Lectures per week** : 4

**All units carry equal weightage.**

**1. Object Oriented Programming (OOP) Concepts and C++**

- Structured programming vs. object oriented programming
- Basic OOP concepts : objects , classes , encapsulation , data hiding , inheritance, polymorphism
- Introduction to C++: structure of a C++ program , data types , variables, constants, expressions, statements and operators
- Usage of header files

**2. Control Flow Constructs, Input/Output and Arrays**

- Control flow statements : if else, for loop, while loop, do while loop, switch, break and continue
- Basic I/O in C++
- Arrays in C++ : introduction, declaration, initialization of one , two and multi-dimensional arrays, operations on arrays
- Working with strings : introduction, declaration, string manipulation and arrays of string

**3. Working with Classes**

- Classes and objects in C++
- Constructors : default, parameterized, copy, constructor overloading and destructor
- Access specifiers, implementing and accessing class members
- Working with objects : constant objects, nameless objects, live objects, arrays of objects

**4. Functions and Inheritance**

- Introduction to functions, library and user-defined functions, parameters passing, default arguments,
- Inheritance: Introduction , derived class declaration, forms of inheritance
- Inheritance and member access ability, constructor and destructor in derived class, construction invocation and data member initialization.

**5. Overloading and Introduction to Pointers**

- Functions overloading , inline functions, friend functions and virtual functions
- Operator overloading : Introduction, overloaded operators, unary operator overloading, operator keyword, operator return values, binary operators overloading, overloading with friend function
- Usages of Pointers in C++ : basic overview
- Dynamic memory allocation

## **6. Working with Files**

- Files : introduction and applications
- File operations : open, read, write, seek and close

### **MAIN REFERENCE BOOKS :**

1. E Balagurusamy : Object Oriented Programming in C++, Tata McGraw-Hill Publishing Co. Ltd.
2. Robert Lafore : Object Oriented Programming in Turbo C++, Guide, Galgotia Pub. (P) Ltd.

### **BOOKS FOR ADDITIONAL READING :**

1. Barkakati N. : Object Oriented Programming in C++, PHI.
2. OOP's using C++ for Dummies.

**Course : US03CBCA03**  
**(Advanced Data and File Structures)**

**Credits** : 4

**Lectures per week** : 4

**All units carry equal weightage.**

**1. Arrays and Trees**

- Introduction to arrays, one and two-dimensional arrays
- Representation of arrays in memory : row-major and column-major order
- Address calculation of elements of one and two-dimensional arrays
- Sparse array, applications of arrays
- Introduction to trees
- Definitions of basic terms : Tree, Directed Tree, Root, Leaf, Branch, Level, Node
- Applications of a tree

**2. Binary Trees and Graphs**

- Binary trees : introduction, linear and linked representations
- Preorder, inorder and postorder traversal of a binary tree
- Insertions and deletions in a lexically ordered binary tree
- The concept of a graph and basic terminology

**3. Sorting**

- Introduction to sorting, applications of sorting
- Basic sorting techniques - bubble sort, selection sort and merge sort
- Implementation of sorting techniques

**4. Searching**

- Introduction to searching, applications of searching
- Basic sorting techniques - sequential search and binary search
- Implementation of searching techniques
- Sorting vs. searching

**5. File Organization - I**

- Terminology, definitions and concepts in file organization
- The structure of sequential files
- Processing sequential files
- Direct files, Processing direct files

**6. File Organization – II**

- Indexed sequential files
- The structure of indexed sequential files
- Processing indexed sequential files

**MAIN REFERENCE BOOKS :**

1. Tremblay J. & Sorenson P. G. : An Introduction to Data Structures with Applications, 2nd Edition, McGraw-Hill International Edition, 1987.
2. Singh Bhagat & Naps Thomas : Introduction to Data Structures, Tata McGraw-Hill Publishing Co. Ltd., 1985.

**Course : US03CBCA04**  
**(Practicals)**

**Credits : 6**  
**No. of laboratory hours per week : 12**

**University examination duration : 4 Hours**

Part-I : Weightage-50%

- Practical based on **US03CBCA01** : Relational Database Management Systems-I

(Questions based on table creation/modification, data insertion/modification, query writing and object creation (e.g. view, synonym, sequence) may be asked)

Part-II : Weightage-50%

- Practical based on **US03CBCA02** : Object Oriented Programming and C++

(Questions based on C++ programming concepts may be asked)

**Course : US03FBCA01**  
**(Financial and Accounting Management)**

Credits : 4  
Lectures per week : 4

All units carry equal weightage.

**1. Introduction to Accounting & Accounting Process**

- Definition of accounting, book keeping, need of accounting.
- Some basic terms : debtor, creditor, solvent, insolvent, bad debts, bad debts recoverable, income, expenditure, trade discount and cash discount
- Objectives, advantages and scope of accounting.
- System of book keeping, classification of accounts and rules for debit and credit.
- Journal : purpose, format, ruling, example, advantages and disadvantages.

**2. The Accounting Process**

- Ledger : purpose, format, posting, closing ledger accounts, advantages and disadvantages
- Trial Balance : purpose, format, advantages and disadvantages
- Subsidiary books : Cash books, Purchase books and Sales books

**3. Final Accounts & Depreciation**

- Trading account and profit and loss account, balance sheet (each with purpose, format, examples)
- Adjustment entries : interest on capital, interest of loan, depreciation on fixed assets
- Depreciating concept and methods (straight line, double decline and sum of the year's digit)

**4. Introduction to Financial Management**

- Introduction, scope of finance, finance functions
- financial manager's role, financial goal, profit versus wealth, conflict of goals, management versus owners
- Financial goal and firm's objectives
- Organization of the finance functions

**5. Ratio Analysis**

- Financial ratio analysis: introduction, users, uses and limitation
- Types of ratio : liquidity ratios, leverage ratios, activity ratios, profitability ratio.

**6. Cost-Volume-Profit (CVP) Analysis and Operating Leverage**

- Introduction, Break-Even Analysis, Cash Break-even point, Operating leverage and risks
- Profit-analysis : impact of changing factors
- CVP analysis for a multi-product firm
- Utility and limitations of CVP analysis

**MAIN REFERENCE BOOKS :**

1. A text Book of Accounting for management by S N Maheshwari and S K Maheshwari, vikas publishing house pvt ltd
2. Financial management eighth edition I M Pandy
3. Naheshgwari S. N. : Introduction to Accounting, Vikas Pub. House 1986.

**BOOKS FOR ADDITIONAL READING :**

1. R.L. Gupta : Principles and practices of accounting
2. Rana & Dalal : Advances Accounting and Auditing :III Sudhir Prakashan Ahmedabad.
3. J.C.Gandhi :Marketing : A managerial Introduction Tata McGraw Hill Publishing CO. Ltd. New Delhi

**Course : US03EBCA01**  
**(Introduction to Microprocessors)**

**Credits** : 2  
**Lectures per week** : 2

**All units carry equal weightage.**

**1. Introduction**

- Microprocessor evolution
- The 8086 microprocessor family overview
- 8086 internal architecture : the execution unit, the bus interface unit
- Overview of 8086 register set
- The concept of assembler

**2. 8086 Instruction Descriptions – I**

- Arithmetic instructions : AAA, AAD, ADC, SUB, SBB, DIV, MUL
- Logical instructions : AND, OR, NOT
- Other instructions : MOV, CMP, NEG, DEC, INC

**3. 8086 Instruction Descriptions – II**

- Rotate and shift instructions : ROL, ROR, SHL, SHR
- Unconditional & conditional JUMP instructions
- Unconditional & conditional LOOP instructions

**4. 8086 Programming Using Assembly Level Language**

- The structure of a typical assembly program
- The concept of assembler directives
- Implementation of control structures : IF-THEN, IF-THEN-ELSE, MULTIPLE IF-THEN-ELSE
- Implementation of looping structures : WHILE-DO, REPEAT-UNTIL
- Programming based on Units 2,3,4

**MAIN REFERENCE BOOKS :**

1. Hall, D. V. : “Microprocessor & Interfacing : programming and Hardware”, Tata McGraw-Hill, 2003.
2. Abel P. : IBM PC Assembly Language and Programming, 5<sup>th</sup> edition, Prentice-Hall of India Pvt. Ltd., 2001

**Course : US03EBCA02**  
**(Introduction to Artificial Intelligence)**

**Credits : 2**

**Lectures per week : 2**

**All units carry equal weightage.**

**1. Introduction**

- Concepts and definitions of Artificial Intelligence (AI)
- Brief history of AI
- AI and related fields
- The AI problems and underlying assumptions

**2. Expert Systems**

- Introduction
- Representing and using domain knowledge
- Knowledge acquisition and representation
- General structure of Expert Systems
- Expert System Shell
- Advantages and disadvantages of Expert Systems

**3. Introduction to AI Techniques and Application Areas - I**

- Introduction to basic search strategies : some examples and classification
- Introduction to heuristic search technique : Best first search
- Using predicate logic
- Representing simple facts in logic

**4. Introduction to AI Techniques and Application Areas - II**

- Introduction to fuzzy logic
- Introduction to various application areas of AI like Natural Language Processing (NLP), Game Playing, Robotics

**MAIN REFERENCE BOOKS :**

1. Elaine Rich : Artificial Intelligence, McGraw Hill, 2001.
2. Patterson, Dan W. : Introduction to Artificial Intelligence, Prentice Hall of India (PHI)
3. R.Akerkar : Introduction to Artificial Intelligence, PHI, 2005
4. S. Russell and P. Norvig, Modern Approach to Artificial Intelligence, Prentice Hall of India Ltd., 2006.
5. R.Akerker and P. S. Sajja, Knowledge-Based Systems, Jones and Bartlett's, MIT, 2010.
6. George Luger, Artificial Intelligence, 5<sup>th</sup> Edition, Addison Wesley, 2004.