SARDAR PATEL UNIVERSIT`Y

BCA

Proposed Syllabus under CBCS

(effective from June 2010)

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

BCA (III Semester)

Course : US03CBCA01

(Relational Database Management Systems-I)

Credits : 4
Lectures per week : 4

All units carry equal weightage.

1. **Introduction to Relational Database Theory and Data Modeling**

   - 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
   - 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

2. **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.

3. **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

4. Query, Subquery, Joins, Transaction Management and Reporting through SQL*Plus

- 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.
- 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 Poblications Pvt. Ltd.
2. Ivan Bayross : SQL,PL/SQL The programming language of Oracle, 3rd revised edition, BPB Publications
3. Kevin Loney, George Koch, Orale9i The Complete Reference , Oracle Press

BOOKS FOR ADDITIONAL READING :

1. Understanding Database Management Systesm : S. Parthsarthy 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 Introduction to 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
   - Control flow statements : if else, for loop, while loop, do while loop, switch, break and continue
2. **Input/Output, Arrays and Working with Classes**
   - 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
   - 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
3. **Functions, Function Overloading and Inheritance**
   - Introduction to functions, library and user-defined functions, parameters passing, default arguments
   - Functions overloading , inline functions, friend functions and virtual functions
   - 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.
4. **Operator Overloading, Pointers and Files**
   - 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
   - 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 & Searching**
   - Introduction to sorting, applications of sorting
   - Basic sorting techniques - bubble sort, selection sort and merge sort
   - Implementation of sorting techniques
   - Introduction to searching, applications of searching
   - Basic searching techniques - sequential search and binary search
   - Implementation of searching techniques
   - Sorting vs. searching
4. **File Organization**
   - Terminology, definitions and concepts in file organization
   - The structure of sequential files
   - Processing sequential files
   - Direct files, Processing direct files
   - 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.
3. R. B. Patel: Data Structure using C – Khanna Publications. ISBN: 81-87522-41-0

ADDITIONAL REFERENCE BOOKS :

1. D. Samantha : Classis Data Structures – PHI Publication
2. G. S. Baluja : Data Structures through C 4th Edition – Danpat Rai & Co.

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.
   - Ledger : purpose, format, posting, closing ledger accounts, advantages and disadvantages
   - Trial Balance : purpose, format, advantages and disadvantages
2. **Subsidiary Books, Final Accounts & Depreciation**
   - Subsidiary books : Cash books, Purchase books and Sales books
   - 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)
3. **Introduction to Financial Management and Introduction to Ratio Analysis**
   - 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
   - Financial ratio analysis: introduction, users, uses and limitation
4. **Ratio Analysis And Cost-Volume-Profit (CVP) Analysis**
   - Types of ratio : liquidity ratios, leverage ratios, activity ratios, profitability ratio.
   - 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
4. Double Entry Book-keeping by T.S. Grewal
5. Financial Accounting & Management for BCA by Rana & Dalal - B.S Shah Prakashan.(4th Edition).

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 Asembly Language and Programming, 5th 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. Elain 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 Bartlettes, MIT, 2010.
6. George Luger, Artificial Intelligence, 5th Edition, Addison Wesley, 2004.