BCA 201 – Relational Database Management System (RDBMS)

No. of Lectures per week: 3
External Marks: 80
Internal Marks : 40
Total Marks   :120

University exam duration 3 hours.

Unit-I	**Relational Databases and SQL**
	- Relational Data Model
	- Introduction to RDBMS
	- Difference between the conventional DBMS and RDBMS Codd Rules
	- Need for Normalization
	- Normalization (1NF, 2NF, 3NF)
	- Introduction to BCNF, 4NF, 5NF
	- Introduction to SQL
	- Data Types:
	- Built-in
	Char, varchar, varchar2, number, date, raw, long raw, lob, rowid
	- ANSI – supported: int, integer, dec, float, real
	- User Defined : arrays
	- CREATE TABLE (without constraints)
	- INSERT, UPDATE, DELETE
	- SELECT (simple with from & where clause)
	- DROP TABLE
	- SELECT * FROM tab
	- DESC
	- ALTER TABLE
	- Substitution variables (&)
	- SPOOL
Unit-II	**Constraints and Functions**
	- Null values
	- Primary Key, Foreign Key
	- Unique Key
	- Check Constraint
	- Use of USER_CONSTRAINTS, USER_CONS_COLUMNS data dictionary views
	- Constraints in CREATE TABLE
	- ALTER TABLE to add/remove constraints
	- Range searching and pattern matching
	- Arithmetic Operators
	- Relational Operators
	- Logical Operators
	- IN, LIKE, BETWEEN
	- Group functions : AVG, MIN, MAX, COUNT, SUM
	- Numeric functions : ABS, POWER, ROUND, TRUNC, SQRT
	- Character Functions : UPPER, LOWER, INITCAP, LENGTH, SUBSTR, LPAD, RPAD, LTRIM, RTRIM
	- Date functions : ADD_MONTHS, LAST_DAY, MONTHS_BETWEEN , Addition and Subtraction of dates

	- Conversion Functions : TO_NUMBER, TO_CHAR, TO_DATE, CHARTOROWID, TO_LOB, Number and Date format models - Miscellaneous functions : NVL, DECODE - Date Format Models
Unit-III	**Queries, Joins & Views** - Joins of two or more tables, self join, outer join, inner join, - Indexes – creating , dropping, uses - Sequences – creating, dropping, altering, using (CURRVAL, NEXTVAL) - Views – creating, dropping, using updateable and non-updateable views - GROUP BY , HAVING clauses - Sub-Queries, nested sub-queries - (EXISTS, ANY, SOME, ALL , correlated sub query not included) - UNION, INTERSECT,MINUS
Unit-IV	**Transactions and Security** - Synonyms – creating, how it is used - Introduction to tablespaces, segment, extents, blocks - Create user accounts - Transaction Processing – need for it, commit, rollback, savepoint - Locks – exclusive and shared locks, implicit locking, explicit locking using LOCK TABLE, SELECT FOR UPDATE - Security (granting and revoking object privileges) - Create role, set role, assign role to user
Unit-V	**Programming Structures** - SQL reports - Procedural extensions to SQL - Control Structure - Loops - Exceptional Handling
Unit-VI	**Cursors and Stored Subprograms** - Cursors – implicit, explicit - DECLARE, OPEN, FETCH, CLOSE, %FOUND, %NOTFOUND, %ISOPEN, %ROWCOUNT - Cursor FOR loop - Stored procedure and Stored Functions - Database Triggers - Introduction to Client Server Computing

Reference Books:

1. Oracle 8i The Complete reference by Kelvin Loney and George Koch, Tata McGrawHill 2000.
2. SQL, PL/SQL the programming language of Oracle (2nd Edition) by Ivan Bayross , BPB publications.
3. RDBMS Manuals
4. Relational Database Design by Jan L. Harrington.

SARDAR PATEL UNIVERSITY
(Effect from June 2004)
BCA 202 – SYSTEM ANALYSIS AND DESIGN

No. of Lectures per week: 3
External Marks: 80
Internal Marks : 40
Total Marks   :120

University exam duration 3 hours.

Unit-I	**SYSTEM CONCEPTS** - Introduction to System - Characteristics of system - The Elements of System - Major system concepts - Types of system : Open/Close Systems etc - Introduction to System Analysis - System Analyst - Systems Approach and System Analysis - Data Pyramid & types of Information Systems
Unit-II	**SDLC** - Introduction to various methodologies of Systems Development - Steps of SDLC: Analysis, Design, Detailed Design, Coding, Testing etc.
Unit-III	**SSADM** - Need of SSADM and introduction to SSADM - Steps of SSADM - Advantages of SSADM - Introduction to SSADM tools - Decision tree - Decision Table - Structured English - Data Dictionary
Unit-IV	**Designing and Fact gathering techniques** - Fact Gathering – Interview, Questionnaires, Record Inspection, Observation - Input Design – Data Capture, Data Verification, Data Validation, Basic Steps in Data Capture - Output Design – Design principles and objectives, Types of output and considerations, Output Media - Form Design – Types, Basic Principles, Considerations and Steps
Unit-V	**DFDs & SYSTEM FLOWCHART SYMBOLS** - DFDs and Symbols used - Constructing a DFD for a small system - Physical and Logical DFDs - Example of a system including physical and logical DFD - Practice of DFD
Unit-VI	- Introduction to CASE Tools - Examples of CASE - System Security - Introduction, identification, Access Controls, Encryption, Audit Controls, System Integrity, Recovery/restart requirements, System failures and recovery - Disaster/Recovery Planning - The plan, The team, Planning tasks etc

Reference Books:

1. S. Parthasarthy & B W Khalkar : Systems Analysis and Design
   1st Edition, Master Ed. Cons.
2. James A Senn : Analysis & Design of Information System
   2nd Edition, TMH International
3. Vinodkumar Garg & S Srinivasan : Workbook on System Analysis & Design
   PHI Publication
4. Elias M. Awad : Systems Analysis and Design
   2nd Edition (1999) Galgotia Publications

SARDAR PATEL UNIVERSITY
(Effect from June 2004)

BCA 203 – DATA COMMUNICATION AND COMPUTER NETWORKS

No. of Lectures per week: 3
External Marks: 80
Internal Marks : 40
Total Marks   :120

University exam duration 3 hours.

Unit-I	**Networking concepts**
	- Introduction to Networking
	    - Advantages of Computer Networking
	    - Disadvantages of Computer Networking
	- Introduction to Computer Communication & Data Transmission Over Long Distance
	- LANs
	    - What are LANs and its Characteristics
	    - Diff. between Multi-user system and LAN
	- Types of Networks
	    - LAN
	    - MAN & WAN
	- OSI Model

Unit-II	**Networking basics**
	- Various Types of Transmission Media
	    - Magnetic Media
	    - Twisted Pair Cable
	    - Coaxial Cables : Baseband Coaxial Cable
	    - Coaxial Cables : Broadband Coaxial Cable
	    - Fiber Optics
	    - Comparision between Fiber Optics and Copper Wires
	- Introduction to the following concepts
	    - Data Rate, Modulation Rate, Spectrum, Bandwidth
	    - Networking terminology : Nodes, Media, Server, Protocols, throughput, Data Rate, Bottlenecks, Hosts, Workstations
	- Circuit Switching, Packet Switching, Message Switching
	- Frequency Division Multiplexing (FDM)
	- Time Division Multiplexing (TDM)

Unit-III	**Networking components**
	- Modems
	    - Introduction to Modems
	    - Basic Principle of Modems
	    - Half Duplex and Full Duplex transmission
	- Concentrator (Asynchronous TDM)
	- Concept of Synchronous and Asynchronous Communication
	- Routers
	- Bridges
	- Hubs
	- Switches
	    - Time Division Switches and Space Division Switches
	- Gateway

Unit-IV	**Communication basics** - Protocols

	- Need of Protocols - Protocol Hierarchy - Asynchronous Transmission - Synchronous Transmission - HDLC - SNMP (Simple Network Management Protocol) - SNMP Model - Study of SNMP Protocol
Unit-V	**Protocols-I** - LAN Topologies - Bus, Star, Ring, Tree, Complete(Mesh), Intersecting Rings (FDDI), Irregular - Ethernet - Baseband and Broadband Ethernets - Examples of LAN Protocols - CSMA/CD (IEEE 802.3) - Token Bus (IEEE 802.4) - Token Ring (IEEE 802.5)
Unit-VI	**Protocols-II** - Brief Introduction to the TCP Protocol - Internet Protocol (IP) - The IP Protocol - Addressing - HTTP - SMTP - MIME - POP

Reference Books
1. Computer Networks : A S Tannenbaum (PHI)
2. Data Communication & Networking : Behrouz A Forouzan
3. Local Area Networks : S K Basandra & S Jaiswal

SARDAR PATEL UNIVERSITY
(Effect from June 2004)
BCA 204 – Data Structures using C++

No. of Lectures per week: 3   External Marks: 80
                                                    Internal Marks : 40
University exam duration 3 hours.   Total Marks   :120

Unit – 1   Object Oriented Programming Concepts and Implementation-I
- Overview of Procedural, Structured, Object Oriented Programming
- Advantages of OOP over Procedural Language
- Basic terminology of OOP : Objects, Classes
- Introduction to Object Oriented Concepts : Encapsulation, Data Hiding, Inheritance, Polymorphism
- Introduction to C++
    - Structure of C++ Program, Data Type, Variables, Constants
    - Expressions Statements, Operators
    - Usage of Header Files using #include statement
    - Control Flow : If ..Else, for Loop, while loop, do…while, switch, break, continue
- Arrays in C++
    - Introduction , Initialization of one, two and multi-dimensional array
    - Operation on arrays

Unit – 2   Object Oriented Programming Concepts and Implementation-II
- String in C++
    - Introduction, Declaration, String Manipulation, Arrays of String
- Structures: Introduction, Enumerated data types, Declaration, Initialization, Array of Structure, Structure within structure
- Introduction to Function: Introduction, Components, Parameter passing, Library functions, Default arguments
- Scope & extent of variables, Storage classes
- Classes & Objects
    - Introduction, Class Specification, Class Objects, Accessing class members, Implementing class members
- Constructors: Parameterized Constructor , Constructor Overloading, Copy Constructor
- Destructor
- Objects: Constant Objects, Nameless Objects, Live Objects, Array of Objects.

Unit – 3   Advanced C++ - I
- Pointers
    - Introduction, Variable, Arithmetic, Void, Constant Pointers, Pointers to function, Pointer to Constant objects, Pointers to Objects, Array of pointers to objects, Pointer to object members, this pointer
    - Dynamic memory allocation
- Functions
    - Overloading, Inline, Friend Function
    - Virtual Function

Unit – 4   Advanced C++ - II
- Operator Overloading
  - Introduction, Over loaded operators, Unary operator overloading, Operator keyword, Operator return values, Binary operator overloading, Overloading of new and delete operators, Overloading with friends Functions.
- Inheritance
- introduction, Derived class definition, Forms of Inheritance, Inheritance & member accessibility, Constructor & Destructor in derived class, Constructor invocation & data member initialization

Unit – 5   Introduction to Data Structure
- Introduction to Data Structure
  - Importance, Meaning, Applications of Data Structure
- Characteristics of algorithm for data Structure
- Operation on Data Structure : Creation, Selection, Updation, Destroy
- Data Types: Primitive and Composite
  - Definition, Hierarchical structure with example
  - Primitive v/s non- primitive data types
- Introduction to Linear and Non Linear data structure
- Primitive Data types
  - Definition, One, Two Dimensional Array
  - N-dimensional array for (row major), Address finding equations, Applications of Arrays
- Linear Data Structures
  - Stack : Definition, Operations on Stack (Push, Pop, Peep, Change), application of Stack(recursion, polish notation, stack machine)
  - Queue : Simple Queue(Definition, Operation(Insert, Delete)), Circular Queue (Definition, Operation(insert, delete) only algorithm)), D-queue (Definition), application of queue – Simulation

Unit – 6   Nonlinear Data Structure & Sorting – Searching Techniques
- Linked List
  - Singly Linked List(Definition, Insertion and Deletion Operation)
  - Doubly Linked List : (Definition, Insertion & Deletion Operation) only algorithms)
- Tree
  - Definitions: Tree, Directed Tree, Root, Leaf, Branch, Level, Root like node, Leaf like node, etc
  - Operations on Binary tree: Insertion, Deletion, Searching
  - Traversal (In-order, Preorder, Post-order)
  - Storage Representation of binary trees
- Sorting Techniques: Bubble, Selection
- Searching Techniques: Sequential Search, Binary Search

Reference Books :
1. An Introduction to Data Structure : Trembley & Sorenson, TMH
2. Mastering in C++ : Venugopal, Rajkumar, Ravishankar

BCA 205 – QUANTITATIVE TECHNIQUES

No. of Lectures per week: 3
External Marks: 80
Internal Marks : 40
Total Marks   :120

University exam duration 3 hours.

Unit-I	**Basic Statistical Techniques**
	- Frequency Distribution
	  - Forming Frequency Distribution & Cumulative Distribution for Discrete and continuous data
	- Measures of Central Tendency(for Grouped & Ungrouped data)
	  - Mean, Median, Mode, harmonic Mean, Geometric Mean, Weighted Mean, Combined Mean
	- Measures of Dispersion (For Grouped & Ungrouped data)
	  - Range, Average Deviation about Mean, Standard Deviation
	  - Quartile Deviation, Coefficient of Variation

Unit-II	**Correlation and Regression Analysis**
	- Correlation
	  - Definition, Karl's Pearson Coefficient of Correlation
	- Method of Curve Fitting by Priciple of Least Square
	  - Fitting of Straight Line & Second Degree Curve
	- Linear Regression, Introduction to Non-Linear regression

Unit-III	**Time Series & Forecasting**
	- Definition, Components and Utilities of time Series
	- Finding of trend
	  - Method of Smoothing of Curve
	  - Moving Average Method
	  - Least Square Method
	- Finding of Seasonal Variation
	  - Simple Average Method
	  - Ration to Trend Method
	  - Ration to Moving Average Method

Unit-IV	**Introduction to Operations Research & Linear Programming** - Nature, Meaning, Characteristics, Phases & Scope of Operation Research - Role of Computers in OP, Modeling in OR - Introduction to Linear Programming, Formulation of LP Problems - Graphical Solution of two variable problems - General Form of LP problems, Slack and Surplus Variables - Matrix form of LP problems, Definitions - Assumption of Linear Programming, Simplex Method - Duality in Linear Programming, Dual Simplex Method

Unit-V	**Transportation Models**
	- Transportation models
	  - Definition, Mathematical & Matrix form of TP
	  - Definition: Feasible Solution, Basic Feasible Solution, Optimum Basic Feasible Solution
	- Initial Basic Feasibility Solution
	- North-West Corner Rule
	- Lowest Method Cost Entry

	- Vogel's Approximation Method
	- Moving towards Optimum Solution
	  - Transportation Algorithm for Minimization Problems
	  - Degeneracy in Transportation Problems
	  - Unbalanced Transportation Problems

Unit-VI	**Assignment Models & Network Analysis**
	- Assignment Models
	  - Definition & Mathematical Formulation of Assignment Problem
	  - Hungarian Method
	- Network Analysis
	- introduction
	- Application
	- Network Diagram Representation
	- Activities, Events, Sequencing
	- Rules for Drawing network Diagram
	- Determination of Critical Path
	- Calculation of Float Values, Total Float & Free Float

Reference Books:

1. Fundamental of Statistics: Gupta S. C. – Himalaya Pub House,1990
2. Operation Research – Sharma S. D. , kedar Nath & Co. Meerut,2000

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BCA 206 – E-COMMERCE

No. of Lectures per week: 3
External Marks: 80
Internal Marks : 40
Total Marks   :120

University exam duration 3 hours.

Unit-I	**INTRODUCTION TO INTERNET** - Basics of Networks – LAN,MAN,WAN,CAN - What is Internet, History of Internet - Internet Related Terms - Architecture: Internet, Intranet, Extranet - Application: Internet, Intranet, Extranet

Unit-II	**INTRODUCTION TO E-COMMERCE**
	- Definition: Communication Perspective, Business Process Perspective, Service Perspective
	- Classification by nature of transaction: B2B,B2C,C2C,C2B, Non business EC, Intrabusiness EC
	- Classification of EC markets
	  - Electronic Market
	  - Inter Organizational Systems
	  - Customer services
	- Benefits to organizations, Consumers, Society
	- Limitations (technical)
	- Framework of EC, Future of EC
	- Application of EC: Banking, Retailing

Unit-III	**ELECTRONIC PAYMENT SYSTEMS & INTERNET SECURITY**
	- Electronic Payment & protocols
	  - Secure Electronic transaction Protocol for credit Card Payment
	  - Electronic Fund Transfer & Debit card on the Internet
	  - Stored value card & e-cash
	  - Electronic cash systems
	- Electronic Payment Tools
	  - Electronic Fund Transfer
	  - Debit Card
	  - Electronic Walle
	  - Smart Card
	- Internet Securty
	  - Need of Internet Security
	  - Firewalls: Types of Firewalls
	  - Security Schemes
	  - Overview: Secret key Cryptography, Public key, digital Signature, Digital Envelope

Unit-IV	**MARKUP LANGUAGE** - Introduction to various markup languages - Introduction to HTOML - Structure : Head & Body Sections

	- Text Formatting - Ordered & Unordered Lists - Table Handling - Images - Forms - Frames
Unit-V	**SCRIPTING** - Introduction to Client side Scripting - Examples of Client Side Scripting - Importance, Data Validation - Control Structure - Event Handling - Client-side scripting using a popular scripting language

Unit-VI	**SERVER SIDE TECHNOLOGY**
	- Introduction to Server side scripting
	- Need of Server side scripting
	- Introduction to Server side Scripting language
	- Introduction to Objects: Application , Session
	- Cookies
	- Connectivity with database
	  - Connection, Recordset, Request, Response
	  - Connection Methods: Open
	  - Recordset Methods: Open, Movefirst, movenext, Moveprevious, movelast, update, Cancelupdate, Delete, Close, Find, addnew
	  - Recordset Properties: Eof, Bof, RecordCount, Bookmark
	  - Response Method: Write, Redirect
	  - Request Collection: Form , QueryString

Reference Books:

1. Electronic Commerce : A Managerial Perspective
   Efraim Turban, Jae Lee, David King, H Michael Chung
   I Person Education

2. World Wide Web Design with HTML
   C Xavier   i. Tata McGraw Hill

3. Beginning ASP 3.0
   David Buser, John Kauffman, Juan Libre, Brian Francis, David Sussman, Chris Ullman, Jon Duckett   Wrox Publication

BCA 207 –Practicals Based on BCA 201 and 202

A. RDBMS

Practical may be give3n on Creation of table, manipulation of data, generating reports, creating database objects like views, sequences, synonyms, indexes, stored procedures and functions, triggers etc for simple applications like student records, college records, library records, railway records, departmental store records etc.

B. System Analysis and Design

Simple case study to be given to design DFD
Weightage of marks may be around 80% for part A, 20% for part B

BCA 208 – Practical Based on BCA 203 and 204

A. Data Structures using C++

Practical may be given on the concepts of OOP like data hiding, encapsulation, polymorphism and inheritance (single level). Also programs for stack, queue (Simple), Singly Linked List and sorting and searching methods can be asked.

B. Data Communication and Computer Network

Different situations/problems may be stated and what components to be used may be asked.

Weightage may be around 80% for part A, 20% for part B.

BCA 209 – Practicals Based on BCA 205 and 206

A. Quantitative Techniques

Practical may be asked for programming based on measures of central tendency, measures of dispersion, correlation, regression, simplex method, transportation problems, assignment problems.

B. E-Commerce

Practical may be asked for creating simple web pages, creating forms with validation, querying database using server side technology and displaying the result on the client side. (HTML, Scripting using VBScript, ASP using VBScript)
Weightage of marks may be around 50% for part A, 50% for part B.