

**BACHELOR OF COMPUTER APPLICATION S**  
**SCHEME OF EXAMINATION – SECOND YEAR(w.e.f. 2014**  
**-15)**

**Semester – IV**

|          |                                        |     |    |     |      |      |
|----------|----------------------------------------|-----|----|-----|------|------|
| BCA-241  | Advanced Data Structures               | 80  | 20 | 100 | 35   | 3hrs |
| BCA-242  | Advanced Programming using C++         | 80  | 20 | 100 | 35   | 3hrs |
| BCA-243  | E -Commerce                            | 80  | 20 | 100 | 35   | 3hrs |
| BCA-244  | Relational Data Base Management System | 80  | 20 | 100 | 35   | 3hrs |
| BCA-245  | Computer Oriented Statistical Methods  | 80  | 20 | 100 | 35   | 3hrs |
| BCA-246  | Management Information System          | 80  | 20 | 100 | 35   | 3hrs |
| BCA -251 | Lab – I                                | 100 |    | 35  | 3hrs |      |
|          | Based on BCA-231 & BCA- 242            | 100 |    | 35  | 3hrs |      |
| BCA -252 | Lab – II Based on BCA-232 & BCA-241    |     |    |     |      |      |

Internal assessment will be based on the following criteria:

- (I) Two Handwritten Assignments : 10 marks  
(Ist Assignment after one month & IInd Assignment after two months)
- (II) One Class Test : 5 marks (one period duration)
- (III) Attendance : 5 marks

Marks for Attendance will be given as under:

- 1. 91% onwards : 5 Marks
- 2. 81% to 90% : 4 Marks
- 3. 75% to 80% : 3 Marks
- 4. 70% to 75% : 2 Marks\*
- 5. 65% to 70% : 1 Mark\*

\* For students engaged in co-curricular activities of the colleges only/authenticated medical grounds duly approved by the concerned Principal.

**NOTE: 1. Practical exam will be conducted annually in two sessions. However the workload will be distributed in both the semesters according to the relevant papers.**

## **BCA - 241 ADVANCED DATA STRUCTURE**

**Maximum Marks: 100**

**External:**

**80**

**Minimum Pass Marks: 35**

**Internal: 20**

**Time: 3 hours**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### **UNIT - I**

Tree: Introduction, Definition, Representing Binary tree in memory, Traversing binary trees, Traversal algorithms using stacks, Binary search trees: introduction, storage, Searching, Insertion and deletion in a Binary search tree, Huffman's algorithm, General trees.

### **UNIT - II**

Graph: Introduction, Graph theory terminology, Sequential and linked representation of graphs, operations on graphs, traversal algorithms in graphs and their implementation, Warshall's algorithm for shortest path, Dijkstra algorithm for shortest path.

### **UNIT - III**

Sorting: Internal & external sorting, Radix sort, Quick sort, Heap sort, Merge sort, Tournament sort, Comparison of various sorting and searching algorithms on the basis of their complexity.

### **UNIT - IV**

Files: Introduction Attributes of a file, Classification of files, File operations, Comparison of various types of files, File organization: Sequential, Indexed-sequential, Random-access file.

Hashing: Introduction, Collision resolution.

### **TEXT BOOKS**

1. Seymour Lipschutz, "Data Structure using C", Tata-McGraw-Hill
2. Horowitz, Sahni & Anderson-Freed, "Fundamentals of Data Structures in C", University Press

### **REFERENCE BOOKS**

1. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Mcgrraw- Hill International Student Edition, New York.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Addison- Wesley, (An Imprint Of Pearson Education), Mexico City.

## BCA - 242 Advanced PROGRAMMING USING C++

**Maximum Marks: 100**

**External:**

**80**

**Minimum Pass Marks: 35**

**Internal: 20**

**Time: 3 hours**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### UNIT - I

Dynamic Polymorphism: Function Overriding, Virtual Function and its Need, Pure Virtual Function, Abstract Class, Virtual Derivation, Virtual Destructor.

### UNIT - II

Type Conversion: Basic Type Conversion, Conversion between objects and basic types, Conversion between objects of different classes, Inheritance: Rules of Derivations - Private, Protected and Public Derivations.

### UNIT - III

Different Forms of Inheritance - Single, Multiple, Multilevel, Hierarchical and Multipath Inheritance Roles of Constructors and Destructors in Inheritance, Genericity in C++: Templates in C++, Function templates.

### UNIT - IV

Class templates in C++, Exception Handling in C++: try, throw and catch, Files I/O in C++: Class Hierarchy for Files I/O, Text versus Binary Files, Opening and Closing Files, File Pointers, Operation on files.

### TEXT BOOKS:

1. Herbert Schildt, C++, The Complete Reference, Tata McGraw-Hill
2. Robert Lafore, Object Oriented Programming in C++, SAMS Publishing

### REFERENCE BOOKS:

1. Bjarne Stroustrup, The C++ Programming Language, Pearson Education
2. Balaguruswami, E., Object Oriented Programming In C++, Tata McGraw-Hill

## BCA-243 E-Commerce

**Maximum Marks: 100**

**External: 80**

**Minimum Pass Marks: 35**

**Internal: 20**

**Time: 3 hours**

**Note:** Examiner will be required to set Nine Questions in all. First question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

#### Unit-I

Introduction to E-Commerce:-Business operations; E-commerce practices vs. traditional business practices; concepts of b2b, b2c,c2c,b2g,g2h,g2c; Features of E-Commerce, Types of Ecommerce Systems, Elements of E-Commerce, principles of E-Commerce, Benefits and Limitations of E-Commerce.

Management Issues relating to e-commerce. Operations of E-commerce: Credit card transaction; Secure Hypertext Transfer Protocol (SHTTP); Electronic payment systems; Secure electronic transaction (SET); SET's encryption; Process; Cybercash; Smart cards; Indian payment models.

#### Unit-II

Applications in governance: EDI in governance; E-government; E-Governance applications of Internet; concept of government –to- business, business-to-government and citizen-to-government; E-governance models; Private sector interface in E- governance. Applications in B2C: Consumers shopping procedure on the Internet; Impact on disinter mediation and re-intermediation; Global market; Strategy of traditional department stores.

#### Unit-III

Products in b2c model; success factors of e-brokers; Broker-based services on-line; On- line travel tourism services; Benefits and impact of e-commerce on travel industry; Deal estate market; online stock trading and its benefits; Online banking and its benefits; On- line financial services and their future; E-auctions – benefits, implementation and impact.

#### Unit-IV

Applications in B2B: Key technologies for b2b; architectural models of b2b, characteristics of the supplier –oriented marketplace, buyer-oriented marketplace and intermediary-oriented marketplace; Just In Time delivery in b2b; Internet-based EDI from traditional EDI; Marketing Issues in b2b.

Emerging Business models: Retail model; Media model; advisory model, made-to-order manufacturing model; Do-it- yourself model; Information service model; Emerging hybrid models; Emerging models in India, Internet & E-Commerce scenario in India; Internet security Issues; Legal aspects of E-commerce

#### **TEXT BOOKS:**

1. Turban E., Lee J., King D. and Chung H.M: "Electronic commerce-a Managerial Perspective", Prentice-Hall International, Inc.
2. Bhatia V., "E-commerce", Khanna Book Pub. Co.(P) Ltd., Delhi.

## **BCA - 244 RELATIONAL DATABASE MANAGEMENT SYSTEM**

**Maximum Marks: 100**

**External:**

**80**

**Minimum Pass Marks: 35**

**Internal: 20**

**Time: 3 hours**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### **UNIT - I**

Relational Model Concepts, Codd's Rules for Relational Model, Relational Algebra:-Selection and Projection, Set Operation, Renaming, Join and Division, Relational Calculus: Tuple Relational Calculus and Domain Relational Calculus.

### **UNIT - II**

Functional Dependencies and Normalization:-Purpose, Data Redundancy and Update Anomalies, Functional Dependencies:-Full Functional Dependencies and Transitive Functional Dependencies, Characteristics of Functional Dependencies, Decomposition and Normal Forms (1NF, 2NF, 3NF & BCNF).

### **UNIT - III**

SQL: Data Definition and data types, SQL Operators, Specifying Constraints in SQL, Basic DDL, DML and DCL commands in SQL, Simple Queries, Nested Queries, Tables, Views, Indexes, Aggregate Functions, Clauses

### **UNIT - IV**

PL/SQL architecture, PL/SQL and SQL\*Plus, PL/SQL Basics, Advantages of PL/SQL, The Generic PL/SQL Block: PL/SQL Execution Environment, PL/SQL Character set and Data Types, Control Structure in PL/SQL, Cursors in PL/SQL, Triggers in PL/SQL, Programming using PL/SQL.

### **TEXT BOOKS:**

1. Elmasri & Navathe, "Fundamentals of Database Systems", 5th edition, Pearson Education.
2. Ivan Bayross, "SQL, PL/SQL-The Programming Language of ORACLE", BPB Publications 3<sup>rd</sup> edition.

### **REFERENCE BOOKS:**

1. C. J. Date, "An Introduction to Database Systems", 8<sup>th</sup> edition, Addison Wesley N. Delhi.
2. Oracle 8 -PL/SQL programming -Scott Urman
3. A Guide to the SQL Standard, Data, C. and Darwen, H. 3<sup>rd</sup> Edition, Reading, MA:1994, Addison-Wesley Publications, New Delhi.

## BCA - 245 COMPUTER-ORIENTED STATISTICAL METHODS

**Maximum Marks: 100**

**External:**

**80**

**Minimum Pass Marks: 35**

**Internal: 20**

**Time: 3 hours**

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### UNIT-I

Basic Statistics: Preparing Frequency Distribution Table and Cumulative frequency, Measure of Central Tendency, Types: Arithmetic mean, Geometric Mean, Harmonic Mean, Median, Mode.

Measure of Dispersion: Range, Quartile Deviation, mean deviation, Coefficient of mean Deviation, Standard Deviation

Moments : Moments About mean, Moments about any point, Moment about origin, Moment about mean in terms of moment about any point, Moment about any point in terms of Moment about mean.

### UNIT-II

Probability Distribution: Random Variable- Discrete Random and Continuous Random variable, Probability Distribution of a Random Variable, Mathematical Expectation

Types: Binomial, Poisson, Normal Distribution, Mean and Variance of Binomial, Poisson, and Normal Distribution.

Correlation: Introduction, Types, Properties, Methods of Correlation: Karl Pearson's Coefficient of Correlation, Rank Correlation and Concurrent Deviation method, Probable error.

### UNIT-III

Regression: Introduction, Aim of Regression Analysis, Types of Regression Analysis, Lines of Regression, Properties of Regression Coefficient and Regression Lines, Comparison with Correlation.

Curve Fitting: Straight Line, Parabolic curve, Geometric Curve and Exponential Curve

Baye's Theorem in Decision Making, Forecasting Techniques

### UNIT-IV

Sample introduction, Sampling: Meaning, methods of Sampling, Statistical Inference: Test of Hypothesis, Types of hypothesis, Procedure of hypothesis Testing, Type I and Type II error, One Tailed and two tailed Test, Types of test of Significance: Test of significance for Attribute-Test of No. of success and test of proportion of success, Test of significance for large samples - Test of significance for single mean and Difference of mean, Test of significance for small samples ( t-test) - test the significance between the mean of a random sample, between the mean of two independent samples

Chi square Test, ANOVA: Meaning, Assumptions, One way classification, ANOVA Table for One-Way Classified Data

### **REFERENCE BOOKS**

1. Gupta S.P. and Kapoor, V.K., Fundamentals of Applied statistics, Sultan Chand & Sons, 1996.
2. Gupta S.P. and Kapoor, V.K., Fundamentals of Mathematical statistics, Sultan Chand and Sons, 1995.
3. Graybill, Introduction to Statistics, McGraw.
4. Anderson, Statistical Modelling, McGraw.

### **BCA - 246 MANAGEMENT INFORMATION SYSTEM**

**Maximum Marks: 100**

**External:**

**80**

**Minimum Pass Marks: 35**

**Internal: 20**

**Time: 3 hours**

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#### **UNIT - I**

Introduction to system and Basic System Concepts, Types of Systems, The Systems Approach, Information System: Definition & Characteristics, Types of information, Role of Information in Decision- Making, Sub-Systems of an Information system: EDP and MIS management levels, EDP/MIS/DSS.

#### **UNIT -II**

An overview of Management Information System: Definition & Characteristics, Components of MIS, Frame Work for Understanding MIS: Information requirements & Levels of Management, Simon's Model of decision-Making, Structured Vs Un-structured decisions, Formal vs. Informal systems.

#### **UNIT - III**

Developing Information Systems: Analysis & Design of Information Systems: Implementation & Evaluation, Pitfalls in MIS Development.

#### **UNIT - IV**

Functional MIS: A Study of Personnel, Financial and production MIS, Introduction to e-business systems, ecommerce - technologies, applications, Decision support systems - support systems for planning, control and decision-making

### **TEXT BOOK:**

1. J. Kanter, "Management/Information Systems", PHI.
2. Gordon B. Davis, M. H. Olson, "Management Information Systems - Conceptual foundations, structure and Development", McGraw Hill.

### **REFERENCE BOOK:**

1. James A. O'Brien, "Management Information Systems", Tata McGraw-Hill.
2. James A. Senn, "Analysis & Design of Information Systems", Second edition, McGraw Hill.

3. Robert G. Murdick & Joel E. Ross & James R. Claggett,  
“Information Systems for Modern Management”, PHI.
4. Lucas, “Analysis, Design & Implementation of Information  
System”, McGra





