Integral University, Lucknow
Department of Computer Application
STUDY & EVALUATION SCHEME
Choice Based Credit System

Bachelor of Computer Application (BCA)
w.e.f. Session 2016-17

Year IInd, Semester IIIrd

S. No.	Course Category	Subject Code	Name of the Subject	Periods				Evaluation Scheme				Subject Total
								Sessional (CA)			End Sem. Exam	
				L	T	P	C	CT	TA	Total	ESE	
1.	Foundation	MT202	Computer Based Numerical and Statistical Techniques	3	1	0	4	25	15	40	60	100
2.	Elective - I	CA201	Combinatorics and Graph Theory	3	1	0	4	25	15	40	60	100
		CA202	Multimedia System									
3.	Core	CA203	Object Oriented Programming Concepts using C++	3	1	0	4	25	15	40	60	100
4.	Core	CA204	Database Management System	3	1	0	4	25	15	40	60	100
5.	Foundation	BM228	Accounting and Financial Management	3	1	0	4	25	15	40	60	100
6.	Core	CA205	Mini Project	0	0	3	2	30	30	60	40	100
7.	Core	CA206	C++ Lab	0	0	3	2	30	30	60	40	100
8.	Core	CA207	DBMS Lab	0	0	2	1	30	30	60	40	100
Total				**15**	**5**	**8**	**25**					**800**

L - Lecture   **T** – Tutorial   **P** – Practical   **C** – Credit   **CT** – Class Test **TA** – Teacher Assessment
Sessional Total (CA) = Class Test + Teacher Assessment

Subject Total = Sessional Total (CA) + End Semester Examination (ESE)

MT202 COMPUTER BASED NUMERICAL AND STATISTICAL TECHNIQUES

w.e.f. Session 2016-17

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UNIT-I
Error and Computer Arithmetic: Error and their analysis, Normalized Floating point arithmetic.
Algebraic and Transcendental equations: Bisection method, Iteration method, False position method, Newton-Raphson method, Rate of convergence of methods, Solutions of simultaneous equations by Gauss Seidel method. [8]

UNIT-II
Finite Differences: Difference operators, Difference tables, Relation between operators, Missing term techniques, Factorial polynomials.
Interpolation for Equal Intervals: Newton's forward and backward formula, Gauss forward and backward formula, Stirling's formula, Bessel's formula.
Interpolation for Unequal Intervals: Divided difference, Newton's divided difference formula, Lagrange's Interpolation formula. [10]

UNIT-III
Numerical Differentiation and Integration: Numerical differentiation, Numerical integration by Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule, Boole's rule, Weddle's rule, Euler-Maclaurin's formula. [8]

UNIT-IV
Solution of Differential Equations: Taylor's series method, Euler's method, Modified Euler's method, Runge-Kutta Method.
Curve Fitting: Method of least squares, Fitting of straight lines, Second degree parabola. [7]

UNIT-V
Time Series and Forecasting: Moving average, Forecasting models and methods.
Testing of Hypothesis: Test of significance, T-test, F-test, Chi-square test, Analysis of Variance. [7]

REFERENCES:

1. Q.S. Ahmad, Zubair Khan and S.A. Khan, "Numerical and Statistical Techniques", Ane Books Pvt. Ltd., New Delhi.
2. S.S. Sastry, "Introductory Method of Numerical Analysis", PHI, New Delhi.
3. P. Kandasamy, "Numerical Methods", S. Chand and Company, New Delhi.
4. Balaguruswamy, "Numerical Methods", T.M.H., New Delhi.
5. Qazi Shoeb Ahmad, M. V. Ismail and S.A.Khan, "Business Mathematics and Statistics", Laxmi Publication, Meerut.

CA201 COMBINATORICS AND GRAPH THEORY

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UNIT-I

Permutation, Combination, Permutation groups and application, Probability, Discrete numeric function and generating function, Combinatorial problems, Difference equation.   [7]

UNIT-II

Recurrence Relation: Introduction, Linear recurrence relation with constant coefficient, Homogeneous solution, Particular solution, Total solution, Solution by the method of generating function.   [7]

UNIT-III

Graphs: Graph, Sub-graphs, Different types of graphs, Basic properties of graphs, Walks, Path and circuits, Connected graphs, Disconnected graphs and component, Euler and Hamiltonian graphs, Various operation on graphs.

Tree: Tree and fundamental circuits, Distance, Diameters, Radius and pendant vertices, Rooted and binary trees, Counting trees, Spanning trees, Finding all spanning trees of a graph and a weighted graph.   [9]

UNIT-IV

Cut Sets: Cut-sets and cut vertices, Properties of Cut Set, All cut sets in a graph, Fundamental circuit and cut sets, Connectivity and Seperatability.

Planar Graphs: Combinatorial and geometric dual, Kuratowski two graphs, Detection of planarity, Some more criterion of planarity, Thickness and Crossings, Vector space of a graph and vectors, Basis vectors, Cut set vector, Circuit vector, Circuit and Cut set verses sub spaces, Orthogonal vector and sub space.

Matrices of Graph: Incidence matrix of graphs, Sub matrices of A(G), Circuit matrix, Cut Set Matrix, Path Matrix, Fundamental circuit matrix and relationship among A_f, B_f, C_f, Range of B_f, Adjacency matrix, Rank nullity theorem.   [9]

UNIT-V

Coloring: Coloring and covering, Partitioning of graph, Chromatic number, Chromatic partitioning, Chromatic polynomials, Four color problem.

Directed graph: Directed graph, Types of directed graphs, Directed paths and connectedness, Euler digraph, Trees with directed edges, Fundamental circuit in digraph, Matrices A, B, C of digraph, Adjacency matrix of digraph.   [8]

REFERENCES:

1. Deo Narsing, "Graph Theory with applications to engineering and computer science", PHI.
2. John Truss, "Discrete mathematics for Computer Science", TMH.
3. C. L. Liu, "Discrete Mathematics", TMH.
4. Swapan K Sarkar, "Discrete Mathematics", S.Chand Publication.

CA202 MULTIMEDIA SYSTEM

w.e.f. Session 2016-17

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UNIT-I
Introduction: Introduction to Multimedia, Multimedia Information, Multimedia Objects, Multimedia in business and work, Convergence of Computer, Communication and Entertainment products.
Stages of Multimedia Projects: Multimedia hardware, Memory & storage devices, Communication devices, Multimedia software's, presentation tools, Tools for object generations, Video, Sound, Image capturing, Authoring tools, Card and page based authoring tools.   [8]

UNIT-II
Multimedia Building Blocks: Text, Sound MIDI, Digital Audio, Audio file formats, MIDI under windows environment, Audio & Video Capture.   [8]

UNIT-III
Data Compression: Huffman Coding, Shannon Fano Algorithm, Huffman Algorithms, Adaptive Coding, Arithmetic Coding, Higher Order Modeling, Finite Context Modeling, Dictionary based Compression, Sliding Window Compression, LZ77, LZW compression, Compression, Compression ratio, Loss less & Lossy compression.   [8]

UNIT-IV
Speech Compression & Synthesis: Digital Audio concepts, Sampling Variables, Loss less compression of sound, Loss compression & silence compression.   [8]

UNIT-V
Images: Multiple monitors, Bitmaps, Vector drawing, Lossy graphic compression, Image file formats, Animations Images standards, JPEG Compression, Zig Zag Coding, Multimedia Database, Content based retrieval for text and images, Video: Video representation, Colors, Video Compression, MPEG standards, MHEG Standard Video Streaming on net, Video Conferencing, Multimedia Broadcast Services, Indexing and retrieval of Video Database, Recent development in Multimedia.   [8]

REFERENCES:

1. Tay Vaughan, "Multimedia, Making IT Work", Osborne McGraw Hill.
2. Buford, "Multimedia Systems", Addison Wesley.
3. Agrawal & Tiwari, "Multimedia Systems", Excel.
4. Mark Nelson, "Data Compression Book", BPB.
5. David Hillman, "Multimedia technology and Applications", Galgotia Publications.
6. Rosch, "Multimedia Bible", Sams Publishing.
7. Sleinreitz, "Multimedia System", Addison Wesley.
8. James E Skuman, "Multimedia in Action", Vikas.

CA203 OBJECT ORIENTED PROGRAMMING CONCEPTS USING C++

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UNIT-I
Object-Oriented Analysis and Data Modeling: Introduction to Object Oriented Concepts, Object Oriented Analysis Modeling, Data Modeling.
Object-Oriented Design : Origin of Object-Oriented Design, Object Oriented Design Concepts, Object Oriented Design methods, Class and object definition, Refining operations, Program Components and Interfaces, Annotation for Object-Oriented Design, Implementation of Detail Design, An alternative Object-Oriented Design Strategy, Integrating OOD with SA/SD.   [8]

UNIT-II
Introduction to OOP and C++: Advantages of OOP, Need of object-oriented programming, Characteristics of object-oriented languages.
C++ Programming Basics: Basic program structure, Input/output using cin/cout, Preprocessor Directives, Comments, Integer, Character, Float data types, Manipulators, Operators, Library functions, Enumerated Data Types.   [8]

UNIT-III
Functions: Basic of functions, Passing arguments to and returning values from functions, Reference Arguments, Overloaded functions, Inline functions, Default Arguments, Friend function, Variable and Storage classes, Call by value and Call by reference.
Objects and Classes: Using class and object, Constructors, Destructor, Objects as function arguments.   [8]

UNIT-IV
Arrays and Operator Overloading : Array Fundamentals, Arrays as class member data, Arrays of objects, Strings, Overloading Unary and Binary operators, Data conversion, Pitfalls of overloading and Conversion.
Inheritance: Derived class and their constructs, Inheritance levels, Public and Private Inheritance, Overriding member functions.   [8]

UNIT-V
Pointers: Pointers with Arrays, Functions, Strings, Pointer to objects, new-delete, Linked-Lists.
Virtual Functions: Virtual, Static function, this pointer.
Error Handling: Try –Catch Block, Finally, Throws.   [8]

REFERENCES:

1. Lafore, Rober S, "The Waite's Group Object Oriented", TMH.
2. Barkakati, Nabajoti, "Object Oriented Programming in C++", Prentice Hall of India.
3. E. Balagrusamy, "Object oriented programming in C++", TMH.

CA204 DATABASE MANAGEMENT SYSTEM

w.e.f. Session 2016-17

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UNIT-I
Introduction to Databases: Advantage of Database System, Database System versus File System, View of Data, Database System Concepts and Architecture: Data Models, Schemas and Instances, Three schema architecture and Data Independence, Database Languages and Interfaces, Classification of Database Management Systems. [8]

UNIT-II
Entity-Relationship Model: Basic Concepts, Constraints, Keys: Primary Key, Super key, Candidate key, Entity Types, Entity Sets, Design issues, Entity-Relationship Diagram, Relations, Relationship types, Roles and Structural Constraints, Weak Entity sets, Extended ER Features, Design of E-R Database Schema, Reduction of an E-R Schema to tables. [8]

UNIT-III
Relational Model and Constraints: Relational model Concepts, Structure of Relational Databases, Constraints: Entity integrity, Referential Integrity, Domain Constraints, Assertions, Triggers, Security and Authorization, Authentication and Encryption.
SQL: Data Definition, Constraints, Schema Changes in SQL, Basic Queries in SQL, More Complex SQL Queries, Insert, Delete and Update Statements in SQL, Views (in SQL), Specifying General Constraints as Assertion, Additional features.
Oracle: Basic Structure of the Oracle System. [8]

UNIT-IV
The Relational Algebra, Tuple Relational Calculus, Data Normalization: Functional dependencies, Normal form concepts and Types: First Normal Form, Second Normal Form, Boyce-Codd Normal form, Third Normal form and Fourth Normal Form. [8]

UNIT-V
Transaction Management and Recovery Techniques: Introduction to Transaction Processing, Transaction Concepts and Properties, Schedules, Serializability of Schedules, Conflict and view serializable schedules, Recovery Concepts, Recovery from Transactions, Introduction to Concurrency Control Techniques. [8]

REFERENCES:

1. Elmasri, Nawathe ,"Fundamentals of Database Systems", Addison Wesley.
2. Silberschatz, Korth, Sudarshan , "Database System Concepts", McGrawHill.

BM228 ACCOUNTING AND FINANCIAL MANAGEMENT

w.e.f. Session 2016-17

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UNIT-I
Accounting: Meaning, Objective, Scope and Uses of Accounting, Types of Accounting, Fundamentals of Accounting: Concept and Conventions, Meaning of GAAP and IFRS, Books of Accounts: Journal, Ledger, Trial Balance, Profit and Loss Account and Balance Sheet, Accounting for Cash: Cash Book.   [8]

UNIT-II
Financial Management: Meaning, Objective, Importance and Scope of Financial Management, Finance Functions and Various Decisions: Investment Decisions, Finance Decisions, Dividend Decisions, Capital Budgeting Decisions, Analysis of Financial Statement, Ratio Analysis: Liquidity, Solvency, Profitability and Efficiency Ratio, Cost Volume Profit Analysis (Break Even Analysis).
[8]

UNIT-III
Cost Accounting: Meaning, Nature, Need, Elements of Cost, Cost Classification and Allocation of Costs, Absorption and Marginal Costing.   [8]

UNIT-IV
Budget and Budgetary Control: Budgetary Approach to Financial Planning, Different types of Budgets, Performance Budgeting, Zero Base Budgeting, Capital Budgeting, Role of Capital Budgeting in Risks and Uncertainties.   [8]

UNIT-V
Fund Flow Statements: Definition, Meaning and Preparation, Cash Flow Statements: Definition, Meaning and Preparation, Working Capital Management: Concept, Nature, Types and Sources of Working Capital in Business.   [8]

REFERENCES:

1. Kulkarni and Satyaprasad , "Financial Management", Himalaya Publishing House.
2. P.C. Tulsion , "Accountancy", Tata McGraw Hill.
3. Nand Dhameja and K.S. Sastry, "Finance and Accounting", Wheeler Publishing.
4. Prof (Dr.) Mansoor Ali, GanpatRai, "Elements and Management Accounting", New Delhi.

CA205 MINI PROJECT

w.e.f. Session 2016-17

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Mini Project is concerned with papers studied in present and earlier semesters. This project work is expected to follow all the professional guidelines for software development. At the end of the work, project report will be prepared and submitted. Project viva-voce will be conducted by the external examiner. Students in a group of maximum two will work on software project.

Mini Project will be planned and carried out all the way through the semester to understand the importance of various concepts of Database and Front-end.

CA206 C++ LAB

w.e.f. Session 2016-17

List of practical using C++ language:

1. Program illustrating Classes and Objects.

2. Program illustrating use of Operator Overloading.

3. Program illustrating use of Function Overloading.

4. Program illustrating use of Friend function.

5. Program illustrating Inline function, Static Member functions.

6. Program illustrating use of Constructor and various types of Constructor.

7. Program illustrating various forms of Inheritance.

8. Program illustrating use of Virtual functions.

9. Program illustrating how Exception Handling is done.

10. Program implementing various kinds of Sorting algorithms, Search algorithms.

CA207 DBMS LAB

w.e.f. Session 2016-17

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Programs to be implemented using SQL by Oracle:

1. Creating tables.
2. Insertion, Deletion, Updation and Retrieval of data.
3. Arithmetic operations, Logical operations and Pattern matching.
4. Concept of Grouping (Group by clause, Having Clause).
5. Use Aggregate function in query.
6. Granting permissions (Grant, Revoke).
7. Write commands for Joins, Union and Intersection.
8. Concept of Sub-query.
9. Concept of Data constraints (Unique Key, Primary Key, Foreign Key).
10. Creating Views and Indexes.
11. Introduction to PL/SQL.