BHARATHIDASAN UNIVERSITY
TIRUCHIRAPPALLI-620 024

B.Sc. COMPUTER SCIENCE

Eligibility : Higher secondary (+2) students with Mathematics as one of his / her subjects

(For the candidates to be admitted from the academic year 2015-16 onwards through Centre for Distance Education)

Non – Semester Pattern

Year	Part	Papers	Exam Hours	Marks
I	I	Language Paper – I	3	100
	II	English Paper – I	3	100
	III	Major Paper-I : Programming in C	3	100
		Major Paper- II : Data Structures and Algorithms in C++	3	100
		Practical-I : C Programming Lab	3	50
		Practical – II : Data Structures Lab using C++	3	50
		First Allied Paper-I : Numerical and Statistical Methods.	3	100
		First Allied Paper –II : Operation Research .	3	100
II	I	Language Paper – II	3	100
	II	English Paper – II	3	100
	III	Major Paper – III : JAVA Programming	3	100
		Major Paper – IV – Relational Database Management	3	100
		Practical – III : JAVA Programming Lab	3	50
		Practical – IV : RDBMS Lab using ORACLE.	3	50
		Second Allied Paper – I : Digital Electronics	3	100
		Second Allied Paper – II : Micro Processor and Its Applications	3	100

Practical 45 marks, Record 5 marks.

Question Paper Pattern:

Section A- 10 x 2 marks = 20 marks

Short answers – Carrying 2 marks each – Two lines – 10 questions (no choice) Two questions from each of the five units.

Section B- 5 x 6 marks = 30 marks

Paragraph answers – 200 words – Either OR type – One from each of the five units.

Section C- 5 x 10 marks = 50 marks

Essay type – 600 words – Either OR type-One from each of the five units.

MAJOR PAPER I

PROGRAMMING IN C

UNIT – I

Evolution and Applications of C - structure of a C program – Data types – Declarations – operators – Expressions – Type conversions – Built-in functions.

UNIT – II

Data Input and Output – Control statements: IF, ELSE-IF, GOTO, SWITCH, WHILE-DO, DO-WHILE, FOR, BREAK and CONTINUE.

UNIT – III

Functions: Defining and Accessing Arguments – recursive functions – storage classes – Arrays: Defining and processing Arrays – Multidimensional arrays – passing arrays to functions – Arrays and strings – String functions – String Manipulation.

UNIT – IV

Pointers – Pointer Declarations – Operations on pointers – pointers to functions – Pointer and strings – pointers and arrays – array of pointers – structures – structures and pointers – unions.

UNIT – V

Data files – Opening, closing and processing files – files with structures and unions – register variables – Bitwise Operations – Macros – Preprocessing.

Text Book:

"Programming in C" – E.Balagurusamy – Tata McGraw Hill Publications.

Books for Reference:

1. "Programming with C" – Byron S.Gottfried – Schaum's outline series – Tata McGraw Hill Publications.
2. "The Sprit of C" – Mullish cooper – Schaum's Outline Series – Tata McGraw Hill Publications.
3. "A first course in Programming with C" – T.Jeyapoovan, Vikas Publishing Hous Pvt. Ltd., New Delhi.

MAJOR PAPER II
DATA STRUCTURES AND ALGORITHMS IN C++

UNIT – I

Introduction to the Basic concepts of C++ Language – Token's, Keyboards, Data types, variables, manipulators – Expression and Control structures – Functions – Function prototyping – call by reference – Function overloading – friend and inline functions – classes and objects – constructors and Destructors.

UNIT – II

Operator overloading – Type conversions – Inheritance – Single, multiple, Hierachical, Hybrid – Polymorphism – Pointers – Virtual functions – Console I/O Operations.

UNIT – III

Files – classes for file stream operations – Opening, Closing and Processing files – End of file detection – File pointes – Updating a file – Error Handling during file operations – Command line arguments – Templates – Exception Handling.

UNIT – IV

Linked lists – Singly linked list, Doubly linked lists, Circular lists, Skip lists, Self-Organizing list – Sparse Tables – Standard Template – Stacks and Queues priority Queues, Stacks, Queues, Priority Queues in the Standard Template Library.

UNIT – V

Binary Trees – Trees, Binary Tree, Binary search Trees, Implementation Binary Trees, Searching a Binary search Tree, Tree Traversal – Insertion – Deletion – Balancing a Tree – Self – Adjusting Trees – Heaps – Polish notation and Expression Trees – Sorting: Insertion, Selection, Bubble, Heap and Quick sort methods.

Books for Study:

1. "Object Oriented Programming with C++" – E.Balagurusamy, Tata McGraw Hill, Publishing Limited, New Delhi- 1995.
2. "Data structures and Algorithms in C++" – Adam Drozdek, Vikas Publishing House, New Delhi – 2001.

Books for Reference:

1. "Object Oriented Programming in C++", - Robert Lafore, Galgotia, 1994.
2. "C++ - The Complete Reference" – Herbert Schitt, 3rd Edition, Tata McGraw Hill, Publishing Limited, 1999.
3. "Fundamentals of Data Structure – Ellis Horowitz and Sartaj Sahir", Galgotia Publications.

PRACTICAL I

C PROGRAMMING LAB

1. Solution of a Quadratic Equation (all cases).
2. Sum of Series (Sine, Cosine, e^x).
3. Ascending and Descending order of numbers using arrays (use it to find largest and smallest numbers).
4. Sorting of names in alphabetical order.
5. Matrix Operations (Addition, Subtraction, Multiplication – use functions).
6. Finding factorials, generating Fibonacci Numbers using recursive functions.
7. String Manipulation without using String functions (String length, String Comparison, String copy, Polidrome checking, counting words and lines in strings – use function pointers).
8. Bisection and Newton-Raphson method
9. Lagranges Interpolation formula.
10. Gauss Elimination Method.
11. Euler and Runge-Kutta (II order only) methods.
12. Trapezoidal and Simpson's $1/3^{rd}$ Rule.
13. Mean, Standard Deviation, Variance.
14. Correlation – regression coefficients.
15. Creation and Processing of Sequential files for payroll and Mark list preparation (use structures for Record Description).

PRACTICAL II

C++ PROGRAMMING LAB

1. Simple Air-line Ticket reservation using linked list.
2. Simple line editor using linked list.
3. Adding, large floating – point numbers using stacks. Extend this program to other arithmetic Operations such as –, * and /.
4. To convert a number from decimal notation to a number expressed in a number system whose base is a number between 2 and 9, Using stacks and queues.
5. Binary Search – Insertion, Deletion.
6. To accept arithmetic expression written in Prefix (Policy) notations, build an expression tree and then traverse the tree to evaluate the expression.
7. Functions for inserting, deleting a node in a threaded tree in which threads are put only in the leaves.
8. Functions to count the number of nodes in a Binary tree, number of leaves, number of right children and Height of the tree and to check whether the tree is perfectly balanced.
9. Depth-First Traversal in trees.
10. Deletion of nodes in a binary tree by merging and copying.
11. Sorting Techniques: Insertion, Selection, Quick sort, Heap sort.

FIRST ALLIED PAPER I

NUMERICAL AND STATISTICAL METHODS

UNIT – I

Numerical methods – errors in numerical calculations – transcendental equation – introduction – Bisection method – iteration method – Method of false position – Newton – rapson method.

UNIT – II

Interpolation – Newton's formulae (forward & backward) for interpolation – Lagrange's interpolation formula – simultaneous linear equations – Gauss Elimination and Gauss Jordan methods – Gauss Seidal method.

UNIT – III

Numerical integration – Trapezoidal and Simpson's rule – differential equation – euler, runge-kutta and predictor and corrector methods.

UNIT – IV

Mathematical expectation – variance – covariance – moment generating functions – theoretical distributions – binomial, poison, normal and exponential distributions – MGFS of these distribution – additive properties – recurrence relations for the moment.

UNIT – V

Linear correlation and regression – properties of correlation and regression coefficients – numerical problems for finding the correlation and regression coefficients.

Reference:

1. "Introductory methods of numerical analysis", S.S.Sastri, PHI, New Delhi 1982.
2. M.K.Jain, S.R.K.Iyengar and R.K.Jain "Numerical methods for science and Engineering computation", Wiley Eastern Limited – 2nd edition –1995.
3. Gupta S.C.and Kapoor V.K.-Fundamentals of Statistics – Sultan Chand and Sons – New Delhi (1994).
4. Bajpat A.C.Cal I.M. and Fairdy J.A. Statistical methods for Engineering and Scientists – John Wiley and Sons.

FIRST ALLIED PAPER II

OPERATIONS RESEARCH

UNIT – I

Basics of operation research (OR) : Characteristics of OR – Necessity or OR in industry – OR and decision making – role of computers in OR. Linear Programming : Formulations and graphical solution of (2 variables) canonical and standard terms of linear programming problem.

UNIT – II

Algebraic solution: simplex methods – charnes method of penalties – two phase simplex method.

UNIT – III

Transportation Model: Definition – formulation and solution of transportation models – The row – minima, column-minima, matrix-minima and vogel's approximation methods. Assignment model: Definition of assignment model – comparison with transportation model – formulation and solution of assignment model.

UNIT – IV

Sequencing problem : Processing of n jobs through 2 machines – processing n jobs through 3 machines – processing 2 jobs through m machines.

GAME THEORY : Characteristics of games – maxima, minimax criteria of optimality – dominance property – algebraic and graphical method of solution of solving 2 x 2 games.

UNIT – V

Networks – Fulkerson's rule – measure of activity – PERT computation – CPM computation – resource scheduling.

NOTE : Equal weight age may be given for all units in the syllabus.

REFERENCE BOOKS:

1. Hamdy A.Taha : Operation Research – An introduction 5th edition, PHI., New Delhi – 1996.
2. Ackoff, R.L. and Sasieni, M.W: Fundamentals of operation research, John wiley and sons, new york 1968.
3. Charnes A.Cooper W. and Hendersen A : introduction to linear programming, john wiley and sons, new york 1953.
4. Srinath l.s.: PERT and CPM Principles and applications, affiliated east press pvt. Ltd., new york 1973.
5. Kanti swarup, p.k. gupta & manmohan – operation research 1996.
6. S. Kalavathy: Operations Research – Second Edition – Vikas Publishing House Pvt. Ltd., 2

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