

BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.
B.Sc. Computer Science – Course Structure under CBCS
(For the Candidates admitted from the Academic year 2009-2010 onwards)

Semester	Part	Course	Title	Instru. Hours/ Week	Cred it	Exam Hours	Marks		Total
							Int	Extn.	
I	I	Language Course – I (LC) – Tamil*/Other Languages ** #		6	3	3	25	75	100
	II	English Language Course - I (ELC)		6	3	3	25	75	100
	III	Core Course – I (CC)	Programming in C and Introduction to Data Structures	6	4	3	25	75	100
		Core Course – II (CC)	Programming in C using Data Structures: Lab	4	3	3	40	60	100
		First Allied Course –I (AC)	Algebra and Calculus	5	4	3	25	75	100
		First Allied Course – II (AC)	Numerical Analysis and Statistics	3	-	-	-	-	-
II	I	Language Course – II (LC) - – Tamil*/Other Languages ** #		6	3	3	25	75	100
	II	English Language Course – II (ELC)		6	3	3	25	75	100
	III	Core Course – III (CC)	Programming in C++	5	4	3	25	75	100
		Core Course – IV (CC)	Programming in C++ : Lab	3	3	3	40	60	100
		First Allied Course – II (AC)	Numerical Analysis and Statistics	2	3	3	25	75	100
		First Allied Course – III (AC)	Operations Research	4	3	3	25	75	100
	IV	Environmental Studies		2	2	3	25	75	100
	V	Value Education		2	2	3	25	75	100

List of Allied Courses

Allied Course I

Allied Course II

Mathematics

Applied Physics

** Syllabus for other Languages should be on par with Tamil.

those who studied Tamil upto +2, but opt for other languages in degree level should study special Tamil

Note:

Internal Marks

External Marks

- | | | |
|---|----|----|
| 1. Theory | 25 | 75 |
| 2. Practical | 40 | 60 |
| 3. Separate passing minimum is prescribed for Internal and External marks | | |

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]

The passing minimum for University Examinations shall be 40% out of 75 marks [i.e. 30 marks]

Core Course – I – Programming in C and Introduction to Data Structures

UNIT – I

Evaluation and Application of C – Structure of a C program – Datatypes – Declaration – Operators- Expression- Type conversion- Built-in-Function. Data input and output- Control statements : IF,ELSE-IF, GOTO ,SWITCH, WHILE –DO, DO-WHILE, FOR,BREAK and CONTINUE.

UNIT – II

Functions : Defining and accessing functions – passing parameters to functions-arguments – Recursive functions- Storage classes- Arrays : Defining and processing arrays – Multidimensional arrays – Passing arrays to functions – Arrays and Strings – String functions- String manipulation .

UNIT – III

Pointers- Pointer declaration- operations on pointers – pointers to functions – pointers and strings – pointers and arrays – array of pointers- structures- structures and pointers-union.

UNIT – IV

Primitive Data Structures – The notion of a data structure – Arrays – Ordered list – Representation of arrays – Stacks – Evaluation of expressions – Queue – Circular Queue.

UNIT – V

List Structures: List – Singly linked lists – Linked stacks and queues – Storage pool – polynomial addition - doubly linked lists – Tree structures fundamentals – Binary tree.

Text Books :

- 1.E.Balagurusamy ,“Programming in C”, Tata McGraw-Hill Publication.
- 2.Ellis Horowitz , Sartaj Sahni, “Fundamentals of Data Structures”, Galgotia Book Source, New Delhi.

Reference Books:

1. Byron S Gottfried,“Programming with C”, Schaum’s Outline Series – Tata McGraw Hill Publications, New Delhi.
2. Trembley and Sorenson, “An Introduction to Data Structures with Applications” McGraw Hill Book Co., (II Edition), New Delhi.

Core Course II – Programming in C using Data Structures : Lab

1. Write a program to find the roots of Quadratic Equation and hence determine the roots.
2. Write a program to find the sum of series using a) Sine b) Cosine c) Exponential Series.
3. Write a program to read the marks of a student in a particular subject and sort them in ascending order. Also display the lowest and highest marks obtained in the subject.
4. Write a program to perform Addition, Subtraction and Multiplication for two matrices using Functions depending on user's choice.
5. Write a program to find a) Mean b) Standard Deviation and c) Variance for a set of n numbers.
6. Write a program to find the a) Factorial value b) Fibonacci series using Recursion.
7. Write a program to perform String Manipulations using Pointers.
 - i. Finding the length of the String
 - ii. Joining two strings
 - iii. String Comparison
 - iv. Palindrome Checking
 - v. Counting the number of uppercase letter, Lowercase letter, digits, vowels, special characters, words and lines.
8. Write a program for creating a list of numbers using Arrays. Also perform insertion, and deletion operation.
9. Write a program to implement a Stack.
10. Write a program to implement a Queue.
11. Write a program to implement a Linked list.
12. Write a program to create a Binary tree and eliminate the duplicate.

Core Course III - Programming in C++

Unit I

An overview of C++ - C++ console I/O - Differences between C and C++ classes – Constructor and Destructor function – inline function – automatic inlining.

Unit II

Assigning object – passing objects to functions – returning object from function – an introduction to friend function – arrays of objects – using pointers to objects – this pointer – new and delete – references – passing references to objects – returning references.

Unit III

Overloading constructor function – copy constructor – default argument – basis of operator overloading – overloading Binary operator – Overloading unary operator – using friend operator function.

Unit IV

Inheritance – base class access control – constructors, destructors and inheritance – multiple inheritance – virtual base classes.

Unit V

File I/O basics – Unformatted binary I/O – random access – introduction to virtual functions – Exception Handling.

Text Book:

1. Herbert Schildt, “Teach Yourself C++”, Third edition, Tata Mcgraw Hill, 2000.

Reference Books:

1. E. Balagurusamy, “Object Oriented Programming with C++”, Tata Mcgraw Hill Publishing Ltd., New Delhi, 2002.
2. Robert Lafore, “Object Oriented Programming in C++”, - Galgotia, 1194
3. Yeswant Kanetkar, “Let us C++”, BPB Publications, 1999.
4. John R. Hubbard, “Programming with C++”, Schaum’s Outline Series, 1996.

Core Course IV Programming in C++ : Lab

1. Create a simple program using class and object.
2. Write a program to illustrate the use of the following concepts
 - i) Default arguments
 - ii) Reference variable
3. Develop an object oriented program to add two “Times”. Assume that the time consists of the members “hours”, “minutes” and “seconds”. Use objects as arguments.
4. Develop a program to create two classes “class1’ with data member number 1 and “class 2” with data member number 2. Develop inline functions to get values for data members and use friend function to add number 1 and number 2.
5. Write a program to define a class employee with data members with relevant details and calculate DA, MA, HRA net pay (DA = 71% of basic py, MA = 10, HRA = 0.5% of basic pay). Create arrays of objects for 10 employees.
6. Write an overload function to multiply two matrices and for multiplying all the elements of the matrix by a constant.
7. Write a program to read the following information from the keyboard.
Reg. No.,Name of the Student,Mark 1,Mark 2,Mark 3
Use default, parameterized and copy constructor to initialize the objects and display the same.
8. Write a program in C++ using pointer for the following
 - a) To copy the contents of one string to another string
 - b) To concatenate the given two strings into a one string
9. Design a base class “person” with data members “empcode”, “name”.

Derive two classes “account” with data members pay and “admin” class with data member experience. The class “master” derives information from both “account” and “admin”. Write a program to create and display the information contained in “master” object using virtual functions.
10. Write a program to illustrate Single inheritance.
11. Write a program to illustrate Multiple inheritance.
12. Write a program in C++ to read a file and to
 - a) Display the contents of the file into the screen
 - b) Display the number of characters and
 - c) The number of line in the files

ALLIED COURSE I (AC) - ALGEBRA AND CALCULUS

UNIT I

Theory of Equations: Relation between roots & coefficients – Transformations of Equations – Diminishing ,Increasing & multiplying the roots by a constant-Forming equations with the given roots –Rolle’s Theorem, Descarte’s rule of Signs(statement only) –simple problems.

UNIT II

Matrices : Singular matrices – Inverse of a non-singular matrix using adjoint method - Rank of a Matrix –Consistency - Characteristic equation , Eigen values, Eigen vectors – Cayley Hamilton’s Theorem (proof not needed) –Simple applications only

UNIT III

Differentiation: Maxima & Minima – Concavity , Convexity – Points of inflexion - Partial differentiation – Euler’s Theorem - Total differential coefficients (proof not needed) –Simple problems only.

UNIT IV

Integration : Evaluation of integrals of types

$$1] \int \frac{px+q}{ax^2+bx+c} dx \quad 2] \int \frac{px+q}{\sqrt{ax^2+bx+c}} dx \quad 3] \int \frac{dx}{a+b \sin x}$$
$$4] \int \frac{dx}{a+b \cos x}$$

Evaluation using Integration by parts – Properties of definite integrals – Fourier Series in the range $(0, 2\pi)$ – Odd & Even Functions – Fourier Half range Sine & Cosine Series

UNIT V

Differential Equations: Variables Separables – Linear equations – Second order of types $(aD^2 + bD + c)y = F(x)$ where a,b,c are constants and $F(x)$ is one of the following types (i) e^{Kx} (ii) $\sin(kx)$ or $\cos(kx)$ (iii) x^n , n being an integer (iv) $e^{Kx} f(x)$

TEXT BOOK(S)

- [1] T.K.Manickavasagam Pillai & others, Algebra, Volume I, S.V Publications , 1985 Revised Edition (Units I, II)
- [2] S. Narayanan, T.K. Manicavachagam Pillai, Calculus, Vol.II, S. Viswanathan Pvt Limited, 2003. (Units III, IV and V)

REFERENCE(S)

- [1] M.L. Khanna, Differential Calculus, Jaiprakashnath and Co., Meerut-2004.

ALLIED COURSE – II (AC)
NUMERICAL ANALYSIS AND STATISTICS

UNIT I

Algebraic & Transcendental equations : Bisection Method , Newton Raphson Method , Iteration method - Finite differences –Forward , Backward differences – Newton’s forward & backward difference interpolation formulae. Lagrange’s interpolating polynomial.

UNIT II

Numerical differentiation - Numerical Integration using Trapezoidal rule and Simpson’s first & second rules (proof not needed) - Solutions to Linear Systems – Gaussian Elimination Method – Jacobi & Gauss Siedal iterative methods – Theory and problems

UNIT III

Numerical solution of ODE : Solution by Taylor Series Method , Euler’s Method , Runge - Kutta 2nd order method- Adam’s Predictor Corrector Method and Milne’s Predictor Corrector Methods

UNIT IV

Mean , Median , Mode , Standard Deviation -Expectation –Variance and covariance – Correlation and Regression –Properties of Simple Correlation and regression coefficients – Simple Numerical Problems only .

UNIT V

Distributions : Discrete & Continuous distributions : Binomial, Poisson , Normal distributions- Properties of normal distributions –Relation between Binomial, Poisson, Normal distributions

TEXT BOOK(S)

- [1] S.S.Sastry, Numerical Analysis (Unit 1 , 2 , 3)
- [2] Gupta.S.C & Kapoor,V.K, Fundamentals of Mathematical Statistics, Sultan Chand & sons, New Delhi -1994. (Units 4 & 5)

REFERENCE(S)

- [1] M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Private Limited, 1999.
- [2] C.E. Froberg, Introduction to Numerical Analysis, II Edn., Addison Wesley, 1979.

ALLIED COURSE – III (AC)

OPERATIONS RESEARCH

UNIT I

Operations Research : Introduction - Basics of OR – OR & decision making – Role of Computers in OR - Linear programming formulations & graphical solution of two variables – Canonical & standard forms of LPP

UNIT II

Simplex Method : Simplex Method for $<$, $=$, $>$ constraints – Charne's method of penalties– Two phase Simplex method.

UNIT III

Transportation problem : Transportation algorithm –Degeneracy algorithm – Degeneracy in Transportation Problem , Unbalanced transportation problem- Assignment algorithm –Unbalanced Assignment problem .

UNIT IV

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

UNIT V

Networks: Network – Fulkerson's rule- measure of activity –PERT computation – CPM computation .- Resource scheduling.

TEXT BOOK(S)

- [1] Manmohan & Gupta , Operations Research, Sultan Chand Publishers, New Delhi

REFERENCE(S)

- [1] Prem Kumar Gupta and D.S. Hira, Operations Research : An Introduction, S. Chand and Co., Ltd. New Delhi,
- [2] Hamdy A. Taha, Operations Research (7th Edn.), McMillan Publishing Company, New Delhi, 1982.