

CHRIST UNIVERSITY

HOSUR ROAD, BANGALORE-560 029



CHRIST
UNIVERSITY

**Proposed SYLLABUS FOR
B.Sc Computer Science
(2009-2010)**

COURSE STRUCTURE – COMPUTER SCIENCE

Semester	Subject Code	Subject	Total teaching Hours/Semester	No of Lecture Hours/Week	Credit
I	CSC131	Computer Fundamentals and C Programming	60	04	3
	CSC151	C Programming Lab	30	02	1
II	CSC231	Operating Systems and Data structures using C	60	04	3
	CSC251	Data structures Lab	30	02	1
III	CSC331	Database Management System, Software Engineering and Object oriented programming in C++	60	04	3
	CSC351	C++ Lab	30	02	1
IV	CSC431	Java Programming and Computer Graphics	60	04	3
	CSC451	Java/Graphics Lab	30	02	1
	CSC432	Internet and Web Technology	45	03	2
V	CSC531	Advanced Java Programming	45	03	2
	CSC532	Computer Networks	45	03	2
	CSC551	Advanced Java Lab	30	02	1
	CSC552	DBMS Project	30	02	1
VI	CSC631	PHP Programming+	45	03	2
	CSC632	Data Warehousing and Data Mining	45	03	2
	CSC651	Main Project	30	02	1
	CSC652	PHP Lab+	30	02	1

First Semester

CSC131 : Computer Fundamentals and C Programming

CSC151 : C Programming Lab

Second Semester

CSC231 : Operating Systems and Data Structures

CSC251 : Data Structures Lab

Third Semester

CSC331 : Database management system and Object oriented programming in C++

CSC351 : C++ Lab

Certificate Programme : **CSC301** : Advanced C Programming

Fourth Semester

CSC431 : Java Programming and computer Graphics

CSC451 : Java/Graphics Lab

CSC432 : Internet and Web Technology

Certificate Programme : **CSC401** : Oracle

Note: A mini project has to be done in C/C++ during their summer holidays which will be evaluated in fifth semester

Fifth Semester

CSC531 : Advanced Java Programming

CSC532 : Computer Networks

CSC551 :Advanced Java Lab

CSC552 : DBMS Lab (Mini Project)

Certificate Programme : **CSC501** : Software Testing Methodologies

Sixth Semester

CSC631 : *PHP Programming

CSC632 : Date warehousing and Data mining

CSC651 : Main Project

CSC652 : *PHP Lab

*-to be finalized later

Certificate Programme : **CSC601** : Python Programming

FIRST SEMESTER

CSC131: Computer Fundamentals and Programming in C

Total teaching Hours/Semester: 60

No of Lecture Hours/Week: 04

I COMPUTER FUNDAMENTALS

Introduction to Computers (02)

Classification of Computers, Characteristics of Computers, Block Diagram of a Digital Computer, Types of Programming Languages, Classification of Software

Introduction to Number system and Codes (02)

Different number systems and their conversions (Decimal, Binary, Octal, and Hexadecimal), 1's complement and 2's complement, Floating Point numbers, Coding- BCD, Gray, ASCII and EBCDIC.

Boolean algebra and Gate networks (05)

Fundamental concepts of Boolean algebra, Inverter gates, AND gate, OR gate, NAND gate, NOR gate, X-OR gate, X-NOR gate, The universal property of NAND gate and NOR gate, Basic laws of Boolean algebra, DeMorgan's theorems, Simplification of Boolean expression, Karnaugh map (SOP)

Combinational Logic (03)

Adders (Half and Full), Decoder, Encoder, Multiplexer, De-multiplexer (Introductory Concepts only)

Flip-Flops (03)

Flip-flops (SR flip-flops, D flip-flops, JK flip-flops), Edge- Triggered flip-flops and Master-Slave flip-flops, Introduction to Registers and Counters

Computer Organization (02)

Instruction format, Addressing modes, Instruction set.

Memory (02)

Memory Hierarchy, Primary Memory-Volatile and non-volatile memory, RAM and ROM, EPROM and EEPROM, Secondary Memory- Floppy Disk and Hard Disk

Microsoft Word (03)

Working with text, Working with Paragraphs, Working with Documents, Using Tables, Working with Pictures and Charts, Using Mail Merge

Ms-Excel (05)

Getting Started with Excel, Building and Editing Worksheets, Formatting a Worksheet, Working with Charts, Working with Formulas and Functions, Automating Worksheet Tasks with Macros, Using Lists, Analyzing List Data, Enhancing Charts and Worksheets, Using Analysis Tools, Analyzing Data with Pivot Tables, Programming using Excel Macros

Microsoft PowerPoint (03)

Creating a Presentation, Modifying a Presentation, Working with Text, Working with Visual Elements, Customizing a Presentation, Creating Output, Delivering a Presentation, Managing Files

Text Books for Computer Fundamentals

1. Mano, Morris M. *Computer System Architecture*. 1986. Prentice Hall India Limited.

2. Bartee, Thomas C. *Digital Computer Fundamentals*. 6th Edition, 1995. TMH.
3. Rajaraman, V. *Fundamentals of Computers*. 2nd Edition. Prentice Hall India Limited.

II PROGRAMMING IN C

Introduction to Programming Concepts

(02)

Software, Application software and System Software, Structured Programming, Algorithms and Flowcharts with Examples

Introduction to C

(03)

History of C, Structure of a C program, The C character set , C Tokens, variables and keywords and identifiers ,Types of C constants and variables. Input / Output Statements in C (Formatted and Unformatted).

C Instructions and Data types

(03)

Type declaration and arithmetic instructions, Integer and float conversions, Type conversion in assignment, Different Operators in C-Arithmetic, Logical, Relational, Bitwise, Conditional, Hierarchy of operations.

Control Structures

(04)

Decision control statements-if, switch, goto, conditional operator statement. Loop control structures-while, do-while, for loop, Break statement, Continue statement.

Arrays

(05)

One dimensional and multidimensional array, Declaration, initialization, and Array manipulations. Searching-Linear, Sorting- Selection and Bubble sort, Strings- Basic Concepts, Library Functions

Functions

(04)

Introduction, function definition and prototyping, types of functions, types of arguments, recursion, passing arrays to functions. Storage classes in C- Automatic, Register, Extern and Static Variables

Pointers

(03)

Definition, Notation, Pointers and arrays, Pointers and functions- call by value and call by reference, Pointers to pointers.

Structures and Unions

(02)

Definition, declaration, accessing structure elements, Array of structures, Structure in a Structure, Unions – definition, declaration, accessing union elements, *Typedef, Enum*.

C preprocessor

(02)

Introduction, Types of C preprocessor directives, Macros, File Inclusion.

Files

(02)

Introduction, Types of files, File opening modes, Input/Output operations in file.

Text Books for Programming in C

1. Balagurusamy, E. *Programming in ANSI C* 4th Edition. Tata McGraw-Hill.

References:

1. Kanetkar, Yashavant. *Let Us C*. 4th Edition. BPB Publications.

CSC151: C PROGRAMMING LAB

Total Hours/Semester: 30

No of Lab Hours/Week: 02

Guidelines:

- The output of the programs should be neatly formatted
- The programs should be user friendly and interactive

Part A

1. To demonstrate the usage of formatted and unformatted I/O statements in C.
2. To demonstrate the concept of automatic type conversion and type casting.
3. To demonstrate the usage of else if ladder.
4. To demonstrate the concept of ASCII values in representing characters.
5. To demonstrate the concept of while loop.
6. To demonstrate the concept of for loop.
7. To demonstrate the concept of switch statement.
8. To demonstrate the concept of 1d arrays.
9. To demonstrate the concept of 2d arrays.
10. To demonstrate the string handling functions.

Part B

11. To demonstrate string manipulation.
12. To demonstrate the concept of 2dimensional character arrays.
13. To demonstrate the concept of functions.
14. To demonstrate the selection sort using functions.
15. To demonstrate the concept of recursion.
16. To demonstrate the concept of pointers.
17. To demonstrate the difference between call by value and call by reference.
18. To demonstrate the concept of structures.
19. To demonstrate the concept of unions.
20. To demonstrate the concept of macros.
21. To demonstrate concept of files.
22. Create the address database of your friends , make an invitation and send it through mail merge facility.
23. Prepare a worksheet to maintain student information. The work sheet should contain Roll Number, Name and marks in 5 subjects. (Max marks is 100). Calculate the total marks. Assign the grade according to the following . Assign grade 'A' if the total marks is above 450. From 401 to 449 assign grade 'B'. From 351 to 400 grade grade C. From 300 to 350 grade 'D'. For the total marks less than 350 No grade. A student is eligible to get a grade only when he gets 40 and above in all the subjects. In such cases the grade is FAIL. Draw the pie and bar chart for subjects vs marks.
24. Prepare presentation about your favourite sports personality with all the features of power point. Include proper background and select different animations for the points you have mentioned

SECOND SEMESTER

CSC231: Operating Systems and Data Structures

Total teaching Hours/Semester: 60

No of Lecture Hours/Week: 04

I OPERATING SYSTEMS

Introduction (02)

What is an operating system? Functions of Operating System Simple Batch systems Multiprogrammed Batch systems – Time-sharing systems-Parallel systems-Distributed systems – Real Time Systems

Operating System Structures (03)

System components – Operating System services – System calls, System Programs – Introduction to various System Structure

Process Management (05)

Process Concept – Operation on Processes - Process Scheduling – CPU scheduling – Scheduling criteria – Scheduling Algorithms – Co-operating Processes – Introduction to Threads – Inter process communication, Critical-section Problem-Semaphores

Deadlocks (03)

Deadlocks – Characteristics of deadlocks – Methods for handling deadlocks – Deadlock Prevention – Avoidance – detection. Recovery from Deadlock

Storage Management (06)

Logical versus physical address space – swapping – Contiguous Allocation – Paging – Segmentation – Segmentation with Paging – Demand Paging – Page Replacement – Page Replacement Algorithms. – Allocation of Frames – Thrashing.

Secondary – Storage Structure (02)

Disk Structure – Disk scheduling Algorithms – Disk Management

File System Implementation (02)

File – System Structure – Allocation Methods
Free Space Management – Directory Implementation

UNIX Case Study

Introduction (02)

History, features of Unix, Unix Kernel Architecture, Kernel Data Structures

UNIX File System (02)

Structure of a regular file, Inode, Directories, Allocation of Disc locks.

Process Management (03)

Process stages and Transitions – Layout of system memory – Context of a process, Process Creation – signals – Process Termination – Invoking other programs – PID & PPID.

Text Book for Operating Systems

1. Silberschatz, Abraham and Galvin, Peter Baer. *Operating System Concepts*. 5th Edition. John Wiley and Sons

References:

1. Maurice J. Bach, The Design Of The Unix Operating System, Eastern Economy Edition, Prentice Hall of India.

II DATA STRUCTURES USING C

Introduction to Data Structures (03)

Dynamic memory allocation, Garbage collection, Definition of data structures, Classification of data structures.

Array Operations (05)

Arrays and their representation in memory, Operations on arrays – Insertion, deletion and traversals, sorting- insertion sort, string manipulation using pointers.

Linked Lists (06)

Linked lists – creation, Operations on linked list – insertion and deletion, Doubly linked list-creation, Header and circular linked list.

Stacks (06)

Stacks – Array representation of stacks and linked list representation. Application of stacks – recursion, Postfix and infix expressions.

Queues (05)

Queues – Arrays and linked list representation, Priority queues, deque, Circular queue, Application of queues

Trees (05)

Trees – Types of trees, Representation of binary trees in memory, binary tree traversals

Text Book for Data Structures

1. Lipschultz, Seymour. *Data Structures*. Schaum's Series.
2. Prof. P.S. Deshpande & Prof. O.G. Kakde, C & Data Structures, WILEY-dreamtech India Pvt Ltd.

CSC251: Data Structures Lab

Total Hours/Semester: 30

No of Lecture Hours/Week: 02

PART A

1. Menu driven program to insert elements into an array and delete elements from an array.
2. Program to implement insertion sort.
3. Menu driven program to concatenate two strings and extract a substring from a string using pointer.
4. Program to insert an element into a linked list.
5. Program to delete an element from a linked list.
6. Program to create and display a doubly linked list.

PART B

7. Program to implement a stack using arrays
8. Program to implement a stack using pointers
9. Program to implement a queue using arrays
10. Program to implement a queue using pointers
11. Program to create a binary tree and perform the traversals

THIRD SEMESTER

CSC331: Database Management System, Software Engineering and Object Oriented Programming in C++

Total teaching Hours/Semester: 60

No of Lecture Hours/Week: 04

I Object Oriented Programming in C++

(30 hours)

Introduction to C++

(2)

Object oriented programming paradigm – Basic concepts of OOP – Benefits of OOP – what is C++? – applications of C++ – structure of C++ program

Tokens, Expressions and Control Structures

(3)

Tokens – Keywords – Identifiers and constants – Basic data types – user defined data types – derived data types – symbolic constants – type compatibility – declaration of variables – dynamic initialization of variables – reference variables – operators in C++ - scope resolution operator – member dereferencing operators – memory management operators – manipulators – type cast operator – expressions and their types – special assignment expressions- implicit conversions – operator overloading –operator precedence – control structure.

Functions in C++

(3)

Introduction – main function – function prototyping – call by reference – return by reference – inline functions – default arguments – const arguments – function overloading – friend and virtual functions – math library functions

Classes and objects

(4)

Introduction – specifying a class – defining member functions – c++ program with class – making outside function Inline – nesting member functions – private member functions – arrays within a class – memory allocation for objects – static data members – static member functions arrays of objects – objects as function arguments – friendly functions – returning objects – const member functions – local classes.

Constructors and destructors

(4)

Introduction – constructors – parameterized constructors – multiple constructors in a class – constructors with default arguments – dynamic initialization of objects – copy constructor – dynamic constructors – const objects – destructors

Operator overloading and type conversions

(5)

Introduction – Defining operator overloading – overloading unary operator – overloading binary operator – overloading binary operators using friend function – manipulation of strings using operators – rules for overloading operators – type conversion

Inheritance

(5)

Introduction – defining derived classes – single inheritance – making a private member inheritable – multilevel inheritance – multiple inheritance – hierarchical inheritance – hybrid inheritance – virtual base classes – abstract classes constructors in derived classes – nesting of classes

Pointers, virtual functions and polymorphism

(4)

Introduction - pointers – pointers to objects this pointer – pointer to derived classes – virtual function – pure virtual function

Text Book for Object Oriented Programming in C++

1. Balaguruswamy, E. *Object Oriented Programming with C++*. 4th Edition. TMH.

References:

1. Lafore, Robert. *Object oriented programming in Turbo C++*. 2nd Edition, TMH. 2001.
2. Venugopal & Rajkumar, *Mastering C++*,
Eric, Nagler, C++-Hands on approach.

II Software Engineering

(15 hours)

Introduction to Software Engineering

(02)

Software & Software Engineering – Phases in software Development – Software Development Process models-Waterfall Model-Prototype Model-Iterative Model–Spiral Model-Role of Management in Software Development

Software Requirements Specification

(03)

Role of SRS – Problem Analysis – Requirement Specification – Validation – Metrics – Monitoring and Control

Planning a Software Project

(03)

Cost Estimation – Project scheduling – Staffing and Personnel planning – Team Structure – Software configuration management – Quality Assurance plan – Project monitoring plans – Risk management

Design

(03)

Design objectives – Design Principles – Module level concepts – Design methodology – Structured Design – Design specifications – Verifications – Detailed Design and Process design language

Coding

(02)

Programming practice - Verification – Metrics – Monitoring and Control

Testing

(02)

Testing fundamentals – Functional Testing – Structural Testing – Testing Process – Metrics

Text Book for Software Engineering

1. Jalote, Pankaj, An Integrated approach to Software Engineering, Narosa Publications, 2nd Edition.

Reference Book for Software Engineering:

1. Pressman, Roger S. *SoftwareEngineering*. 5th Edition. TMH

III DATABASE MANAGEMENT SYSTEM

(15 hours)

Introduction

(02)

Basic concepts : Data, Database, DBMS, Disadvantages of File oriented Systems, Advantages of DBMS, database languages, characteristics of Database, Role of DBA, Data abstraction (3Scheme architecture), Views – Logical, Conceptual and physical and logical independence, Data Base users

Data Models

(03)

Introduction to Data Models, Mapping Cardinalities, ER Model – Conventions and Symbols, constraints for ER model, Relationship and Examples, Relational Model, Network Model and Hierarchical Model, Differences among the models

RDBMS

(03)

Relational Data Base Concepts – Attribute, Tuple, Domain, Type of Attributes, Single, Multi valued, stored, Derived, the right, keys – primary, index, candidate, alternate, super key, foreign key, relationships. Relational Algebra operations – union, intersection, difference, Cartesian product, selection, projection, join, division, domain, domain integrity, integrity rules – entity integrity, referential integrity

DATABASE DESIGN – Design Guidelines

(03)

Normalization and its properties (1st NF, 2nd NF, 3rd NF & BCNF)

INTRODUCTION TO SQL

(04)

DDL commands – create table/views / index, drop, alter, DML commands – select, insert, delete, update, etc. DCL commands – grant, revoke, and commit, TCL commands, SQL query, Sub-query, nested query, joins – natural inner, outer join

Text Book for DBMS

1. Elmasri, Ramez and Navathe, Shamkant B. *Fundamentals of Database System*, Pearson Education, 5th Edition
2. Abraham Silberschatz, Henry F Korth, S Sudarshan, *Database System Concepts*, Mc Graw – Hill International Edition, 5th Edition.

Reference Book

1. Alex Leon & Mathew Leon, *Database Management Systems*

CSC351: C++ Programming Lab

Total Hours/Semester: 30

No of Lab Hours/Week: 02

Guide lines :

- The output of the programs should be neatly formatted.
- The source code should be indented
- The programs need to be interactive
- Data validations can be done wherever applicable
- Include comments to improve the readability of the program

PART A

1. Aim : To learn about function overloading and default arguments.
2. Aim : To learn about pass by value, pass by reference and return by reference
3. Aim : To learn about classes and objects
4. Aim: To learn about constructor overloading
5. Aim : To learn about copy constructor
6. Aim : To learn about static functions
7. Aim : To learn about friend functions
8. Aim: To learn about formatted I/O operations with manipulators.

PART B

9. Aim : To learn about Unary and Binary operator overloading
10. Aim : To Learn about Different type conversions
11. Aim: To learn about dynamic constructors and destructors.
12. Aim: To learn about simple and multiple inheritances.
14. Aim: To learn about the use of constructors, destructors and copy constructors in derived classes
15. Aim: To learn about the effect of type casting in derived classes
16. Aim: To learn about virtual functions
17. Aim: To learn about sequential file I/O operations.

FOURTH SEMESTER

CSC531: Java Programming and Computer Graphics

Total teaching Hours/Semester: 60

No of Lecture Hours/Week: 04

I Java Programming

Introduction to Java

(02)

History, Features of Java Data Types, Variable, Operators, Java Programming structure, Arrays- One Dimensional array, Two Dimensional array, Strings, Control Structures and break, labeled break statement

Classes and methods

(02)

Class fundamentals, declaring objects, Access modifiers – final, static, abstract, native. Introduction to methods, constructors, command line arguments sub classing and dynamic binding

IO-Packages

(03)

Input/output File handling, Exploring Java IO Byte oriented classes and character oriented classes.

Inheritance, Packages and Interface

(04)

Using SUPER, extend and final keywords with inheritance, Define package, CLASS PATH, access protection, importing packages, Define interface, abstract class and interface, implementing interface, variables in interface. Lang-Package:- Wrapper classes

Exception handling and Multi Threading

(05)

Exceptions Fundamentals of exception, Exception types, using try & catch, multiple catch, nested try, throw, finally, built-in exception, user defined exceptions. Multithreading:- Thread fundamentals, priorities, Creating thread, using Thread class and Runnable interface. Multi-threading programming, String handling

Utility-packages

(06)

StringTokenizer, Stack, Vector, Random, Calendar, HashTable Enumeration Interface, Applets

Abstract Window Toolkit

(8)

AWT - Working with windows, Graphics, & text – Using AWT controls, Layout Managers and Menus, GUI and Event Handling, Event Object and Event Listeners

Text Books

1. Naughton, Patric & Schildt, Herbert. *Java 2 Complete Reference*. 3rd Edition. TMH. Stephen Potts, Alex Pstrikov,
2. R.Nageswara Rao, CORE JAVA An Integrated Approach, 2008 Edition, dreamtech press

CSC632: Computer Graphics

Interactive Computer Graphics

(04)

How the Modern Interactive Display works, Raster Graphics and Random Graphics, Display Devices - CRT – Colour CRT, Display Controller.

Graphics Primitives

(07)

Line Drawing Algorithms – DDA and Bresenham's, Circle Drawing Algorithms – DDA, Midpoint, Midpoint Ellipse drawing algorithm

Graphics Attributes-Line Attributes, Circle Attributes, Area fill Attributes and Character Attributes

Geometric Transformations

(05)

Basic Geometric Transformations - Translation, Rotation, Scaling. Homogeneous Co-ordinates, Composite Transformations. Reflection and Shear

Window and View port

(05)

Windowing Transformation, Clipping, Point Clipping, Line Clipping – Cohen – Sutherland and Liang – Barsky Algorithms, Polygon Clipping – Sutherland – Hodgeman and Weiler - Atherton Algorithms

Three-Dimensional Graphics

(06)

3 D Co-ordinate Systems, 3 D Display Techniques, Three- Dimensional Object Representations - Polygons and Polygon Tables, Curves – Splines and Bezier Curves. Sweep Representations, Constructive Solid Geometry methods, Octrees, Fractals.

Three-Dimensional Geometric Transformations

(03)

3D Transformations – Translation, Rotation and Scaling.

Text Books

1. Hearn, Donald P., Baker, Pauline M. *Computer Graphics using C*. 2nd Edition. Pearson Education.

References

1. Harrington, Steven. *Computer Graphics –A Programming Approach*. 2nd Edition. McGraw-Hill International Editions.
2. Sproull, R F., Newman, W M. *Interactive Computer Graphics*. 2nd Edition. Tata-McGraw Hill Publishing.

CSC551: Java Lab

Total Hours/Semester: 30

No of Lab Hours/Week: 02

PART A (Java)

1. Write a program to implement methods in String class.
2. Write a program to implement methods in Mat
3. h class.
4. Write a program to implement the concept of inheritance.
5. Write a program to implement the concept of dynamic array.
6. Write a program to create object for Queue and Stack and use all methods.
7. Write a program to execute any Windows application (Like notepad calculator etc).
8. Write a program to copy a file to another file using java IO package classes. Get the file names at run time and if the target file already exists then ask confirmation to overwrite and take necessary actions.
9. Use String Tokenizer class to split a string into tokens using different classes.
10. Write an Applet with a Text Field in which the user will be allowed to enter only numbers.
11. Write an applet with a canvas and a label on it. Whenever the mouse moves on it coordinates are displayed in the center of the canvas and on the label.
12. Create a Digital Clock that displays the current time. Use appropriate facilities of the Thread class to avoid flickering of the time.
13. Write a program with a Frame When the mouse is clicked on the Frame the position should be stored in a structure and the points should be connected by lines.
14. Write a program that consists of a Frame with a List Box and a Dialog with a TextBox. The text entered in the TextBox should be displayed in the List Box.

PART B (Computer Graphics)

1. Write a program to draw a line using DDA line algorithm
2. Write a program to draw a line using Bresenham's line drawing algorithm.
3. Write a program to draw a circle using midpoint algorithm
4. Write a program to draw an ellipse using midpoint algorithm
5. Write a menu driven program to perform the following transformations on a triangle:
(a) translation (b) rotation (c) scaling
6. Write a program to perform line clipping using Cohen Sutherland algorithm
7. Write a program to perform polygon clipping using Sutherland Hodgeman algorithm

