

**SWAMI DAYANANDA COLLEGE OF ARTS AND SCIENCE,
MANJAKKUDI**

DEPARTMENT OF COMPUTER SCIENCE

Programme: B.C.A

I. Programme Outcomes

PO No.	PO No. Programme Outcomes Upon completion of the B.C.A Degree Programme, the graduate will be able to
PO-1	Understand the basic and advanced concepts of computer science research and career growth.
PO-2	Acquire analytical, creative and problem solving practical skills to meet the industry standards.
PO-3	Apply knowledge of computing principles to solve real time problems.
PO-4	Equip them with Empowered professional and ethical attitude and communicate effectively and work as a team.
PO-5	Implement independent projects of their own choice using latest tools.

II. Programme Specific Outcomes

PSO No.	Programme Specific Outcomes Upon completion of these courses the student would
PSO-1	Acquire academic excellence with professional skill for higher studies and research.
PSO-2	Achieve greater heights in various sectors of IT Industry through analytical design and implementation skills.
PSO-3	Identify and apply computing practices to succeed as an employee or an entrepreneurial pursuit.


Bachelor of Computer Applications - Course Structure under CBCS.

(For the Candidates admitted from the Academic year 2016-2017 onwards)

Semester	Part	Course	Title	Instru. Hours/Week	Credit	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	6	5	3	25	75	100
			Core Practical - I (CP)	Programming in C (P)	3	2	3	40	60	100
			First Allied Course –I (AC)		4	4	3	25	75	100
		First Allied Course – II (AC)		3	-	-	-	-	-	
	IV	Value Education	Value Education		2	2	3	25	75	100
Total				30	19				600	
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 – II (CC)	Programming in C++	6	6	3	25	75	100
			Core Practical - II (CP)	Programming in C++ (P)	3	2	3	40	60	100
			First Allied Course – II (AC)		3	3	3	25	75	100
		First Allied Course – III (AC)		4	2	3	25	75	100	
	IV	Environmental Studies	Environmental Studies		2	2	3	25	75	100
Total				30	21				700	
III	I	Language Course – III (LC) – Tamil*/Other Languages ** #		6	3	3	25	75	100	
	II	English Language Course - III (ELC)		6	3	3	25	75	100	
			Core Course – III (CC)	Programming in Java	6	5	3	25	75	100
			Core Practical - III (CP)	Programming in Java (P)	3	2	3	40	60	100
			Second Allied Course – I (AC)		4	4	3	25	75	100
		Second Allied Course – II (AC)		3	-	-	-	-	-	
	III	Non Major Elective I - for those who studied Tamil under Part I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil upto +2 but opt for other languages in degree programme	Working Principles of Internet		2	2	3	25	75	100
	Total				30	19				600

IV	I	Language Course –IV (LC) - Tamil*/Other Languages ** #		6	3	3	25	75	100	
	II	English Language Course–IV (ELC)		6	3	3	25	75	100	
	III	Core Course – IV (CC)	Database Systems		5	5	3	25	75	100
		Core Practical - IV (CP)	Database Systems (P)		3	2	3	40	60	100
		Second Allied Course– II (AC)			3	3	3	40	60	100
		Second Allied Course–III (AC)			3	2	3	25	75	100
	IV	Non Major Elective II - for those who studied Tamil under Part I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil upto +2 but opt for other languages in degree programme	Fundamentals of Information Technology		2	2	3	25	75	100
		Skill Based Elective - I	Skill Based Elective - I		2	2	3	25	75	100
Total				30	22				800	
V	III	Core Course V [CC]	Data Structures and Algorithms		5	5	3	25	75	100
		Core Course VI [CC]	Operating Systems		5	5	3	25	75	100
		Core Course VII [CC]	Digital Computer Fundamentals		5	5	3	25	75	100
		Core Practical V [CP]	Computer Graphics and Animation (P)		4	3	3	40	60	100
		Major Based Elective - I	Computer Graphics / Software Engineering / System Testing		5	5	3	25	75	100
	IV	Skill Based Elective II	Skill Based Elective - II		2	2	3	25	75	100
		Skill Based Elective III	Skill Based Elective – III		2	2	3	25	75	100
		Soft Skills Development	Soft Skills Development		2	2	3	25	75	100
Total				30	29				800	
VI	III	Core Course VIII [CC]	Computer Networks		6	6	3	25	75	100
		Core Course IX [CC]	Programming in PHP		6	6	3	25	75	100
		Core Practical VI [CP]	Programming in PHP (P)		5	4	3	40	60	100
		Major Based Elective - II	Cloud Computing / Business Process Outsourcing /Mobile Computing		6	6	3	25	75	100
		Major Based Elective - III	Mini Project (Students to do it in their respective Colleges) / Linux Lab/ Dot Net Lab		6	6	3	40	60	100
	V	Extension Activities	Extension Activities		-	1	-	-	-	-
		Gender Studies	Gender Studies		1	1	3	25	75	100
	Total				30	30				600
Grand Total				180	140				4100	

List of Allied Courses

Allied Course I

Allied Course II

Mathematics

Accounting and OB

Language Part – I	-	4
English Part –II	-	4
Core Paper	-	9

Core Practical	-	6
Allied Paper	-	4
Allied Practical	-	2
Non-Major Elective	-	2
Skill Based Elective	-	3
Major Based Elective	-	3
Environmental Studies	-	1
Value Education	-	1
Soft Skill Development	-	1
Gender Studies	-	1
Extension Activities -	-	1 (Credit only)

* for those who studied Tamil upto 10th +2 (Regular Stream)

+ Syllabus for other Languages should be on par with Tamil at degree level

those who studied Tamil upto 10th +2 but opt for other languages in degree level under Part I should study special Tamil in Part IV

** Extension Activities shall be out side instruction hours

Non Major Elective I & II – for those who studied Tamil under Part I

a) Basic Tamil I & II for other language students

b) Special Tamil I & II for those who studied Tamil upto 10th or +2 but opt for other languages in degree programme

Note:

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

FOR THEORY

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]

FOR PRACTICAL

The passing minimum for CIA shall be 40% out of 40 marks [i.e. 16 marks]

The passing minimum for University Examinations shall be 40% out of 60 marks [i.e. 24 marks]

CORE COURSE – I
PROGRAMMING IN C

Objective: To impart basic knowledge of Programming Skills in C language.

Unit I

Introduction to C – Constants, Variables, Data types – Operator and Expressions.

Unit II

Managing Input and Output operations – Decision Making and Branching – Decision making and Looping.

Unit III

Arrays – Character Arrays and Strings – User defined Functions.

Unit IV

Structures and unions – Pointers – File management in C.

Unit V

Dynamic memory allocation – Linked lists- Preprocessors – Programming Guide lines.

Text Book:

1. Balagurusamy E .,Programming in ANSI C , Sixth Edition, McGraw-Hill, 2012

Reference Book:

1. R.S.Bichkar, Programming with C, University Press, 2012

Semester: I	Core Course : I	Programming in C	Credit : 5	Allotted hours per week: 6
--------------------	------------------------	-------------------------	-------------------	-----------------------------------

CO01: Introduction to C – Constants, Variables, Data types

CO02: Managing Input and Output operations .

CO03: Applying arrays, Functions, Structures, Unions and Pointers concepts used to developing the programs.

CO04: File management concepts in C Programs

CO05: Dynamic memory allocation & Programming Guide lines

PSO-PO-CO MAPPING MATRIX

PO & PSO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03
CO								
CO01	2	3	3	-	2	3	2	2
CO02	1	2	2	1	1	1	2	1
CO03	2	1	3	1	2	3	1	3
CO04	1	2	2	-	3	1	2	2
CO05	2	2	3	-	3	2	1	-

CORE PRACTICAL I

PROGRAMMING IN C (P)

Objective : To Impart Practical Training in C Programming Language

1. Write a Program to convert temperature from degree Centigrade to Fahrenheit.
2. Write a Program to find whether given number is Even or Odd.
3. Write a Program to find greatest of Three numbers.
4. Write a Program to using switch statement to display Monday to Sunday.
5. Write a Program to display first Ten Natural Numbers and their sum.
6. Write a Program to find Multiplication of Two Matrices.
7. Write a Program to find the maximum number in Array using pointer.
8. Write a Program to reverse a number using pointer.
9. Write a Program to solve Quadratic Equation using functions.
10. Write a Program to find factorial of a number using Recursion.
11. Write a Program to show Call by Value and Call by Reference.
12. Write a Program to add two numbers using pointer.
13. Write a Program to create a file containing Student Details.
14. Write a Program to update the details of student's information using various file modes.

Semester: I	Core Practical : I	Programming in C (P)	Credit : 2	Allotted hours per week: 3
--------------------	---------------------------	-----------------------------	-------------------	-----------------------------------

CO01: Write simple programs using C fundamentals and control statements .

CO02: Develop various menu driven programs using concepts of control statements, arrays, functions and pointers.

CO03: Develop a student details using structure and file concepts.

CO04: Develop a Program to show Call by Value and Call by Reference.

CO05: Develop a Program to find factorial of a number using Recursion.

PSO-PO-CO MAPPING MATRIX								
PO & PSO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03
CO								
CO01	2	2	2	2	3	3	2	2
CO02	2	2	2	2	3	3	3	3
CO03	1	1	3	1	3	3	1	1
CO04	2	3	1	2	2	3	2	2
CO05	3	2	1	2	2	3	2	2

CORE COURSE II
PROGRAMMING IN C++

Objective: To impart basic knowledge of Programming Skills in C++ language.

Unit I

Principles of Object- Oriented Programming – Beginning with C++ - Tokens, Expressions and Control Structures – Functions in C++

Unit II

Classes and Objects – Constructors and Destructors – New Operator – Operator Overloading and Type Conversions

Unit III

Inheritance: Extending Classes – Pointers- Virtual Functions and Polymorphism

Unit IV

Managing Console I/O Operations – Working with Files – Templates – Exception Handling

Unit V

Standard Template Library – Manipulating Strings – Object Oriented Systems Development

Text Book

1. Balagursamy E, Object Oriented Programming with C++, Tata McGraw Hill Publications, Sixth Edition, 2013

Reference Books

1. Ashok Kamthane, Programming in C++, Pearson Education, 2013.

Semester: II	Core Course : II	Programming In C++	Credit : 6	Allotted hours per week: 6
-------------------------------	-----------------------------------	---------------------------	-------------------	---------------------------------------

CO01: State OOPS and Relate C and C++

CO02: Categorize OOPS such as encapsulation, abstraction, polymorphism .

CO03: Apply encapsulation concepts in developing the programs with classes and objects.

CO04: Identify different types of inheritance and apply them for reusability of code.

CO05: Managing Console I/O Operations and Object Oriented Systems Development programs

PSO-PO-CO MAPPING MATRIX								
PO & PSO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03
CO								
CO01	2	2	3	-	2	3	2	-
CO02	1	2	2	1	2	3	2	-
CO03	2	2	3	1	2	3	2	-
CO04	1	2	2	-	3	2	2	-
CO05	2	2	3	-	3	3	2	-

CORE PRACTICAL II

PROGRAMMING IN C++ (P)

Objective : To Impart Practical Training in C++ Programming Language

1. Classes

Write a Program using a class to represent a Bank Account with Data Members – Name of depositor, Account Number, Type of Account and Balance and Member Functions – Deposit Amount – Withdrawal Amount. Show name and balance. Check the program with own data.

2. Constructor & Destructor

Write a program to read an integer and find the sum of all the digits until it reduces to a single digit using constructor, destructor and default constructor.

3. Default & Reference Argument

Write a program using function overloading to read two matrices of different data types such as integers and floating point numbers. Find out the sum of the above matrices separately and display the total sum of these arrays individually.

4. Operator Overloading

- a. Addition of Two Complex Numbers.
- b. Matrix Multiplication

5. Inheritance

Prepare Pay Roll of an employee using Inheritance.

6. Pointers

- a. Write a Program to find the number of vowels in a given text
- b. Write a Program to check for Palindrome

7. Files

Prepare Students Mark List in a file with Student Number, Mark in four subjects and Mark Total. Write a program to arrange these records in the ascending order of Mark Total and write them in the same file overwriting the earlier records.

8. Exception Handling

Prepare Electricity Bill for customers generating and handling any two Exceptions.

Semester: II	Core Practical : II	Programming In C++ (P)	Credit : 2	Allotted hours per week: 3
---------------------	--------------------------------	-------------------------------	-------------------	---------------------------------------

CO01: Implemented virtual functions in C++.

CO02: Data encapsulation, data hiding and private functions implemented in C++.

CO03: Write a program to find the matrix multiplication using operator overloading.

CO04: Classes, Pointers, Inheritance.

CO05: Exception handling, file Handling.

PSO-PO-CO MAPPING MATRIX								
PO & PSO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03
CO								
CO01	2	2	1	2	2	3	2	1
CO02	2	1	2	3	2	3	2	2
CO03	2	2	2	1	1	3	2	2
CO04	3	3	1	3	3	3	3	3
CO05	3	2	1	3	1	3	3	3

CORE COURSE III

PROGRAMMING IN JAVA

Objective: To understand the basic concepts of Object Oriented Programming with Java language

Unit I

Object Oriented Programming : Introduction to OOP – Objects and Classes – Characteristics of OOP – Difference between OOP and Procedure Oriented Language – Introduction to java Programming : Introduction – Features of Java – Comparing java and Other Languages – Applications and Applets – Java Development Kit – Complex Programs – Java Source File Structure – Prerequisites for Compiling and Running Java Programs

Unit II

Java Language Fundamentals : The Building Blocks of Java – Data Types – Variable Declarations – Wrapper Classes – Operations and Assignment – Control Structures – Arrays – Strings – StringBuffer Class

Unit III

Java as an OOP Language : Defining Classes – Modifiers – Packages - Interfaces

Unit IV

Exception Handling : Introduction – Basics of Exception Handling – Exception Hierarchy – Constructors and Methods in Throw able Class - Unchecked and Checked Exceptions – Handling Exceptions in Java – Exception and Inheritance – Throwing User-defined Exceptions – Redirecting and Rethrowing Exceptions – Advantages of Exception Handling Mechanism – Multithreading : Introduction – Creating Threads – Thread Life-cycle – Thread Priorities and Thread Scheduling – Thread Synchronization – Daemon Threads – Tread Groups – Communication of Threads

Unit V

Files and I/O Streams : Overview – Java I/O – File Streams – FileInputStream and FileOutputStream – File Streams – RandomAccess File – Serialization - Applets : Introduction – Java Applications versus Java Applets – Applet Life-cycle – Working with Applets – The HTML APPLET Tag – The java.Applet package

Text Book :

1. Object Oriented Programming through Java, P.Radha Krishna, University Press,2011

Reference Book:

1. Java Programming, K.Rajkumar, Pearson India, 2013

Semester: III	Core Course : III	Programming in JAVA	Credit : 5	Allotted hours per week: 6
----------------------	------------------------------	----------------------------	-------------------	---------------------------------------

CO01: Apply encapsulation concepts in developing the programs with classes and objects..

CO02: Identifying different types of inheritance and apply them for reusability of code..

CO03: Java as an OOP Language, Packages - Interfaces..

CO04: Design program using different methods of thread creation and exception handling.

CO05: Create Internet program using applets.

PSO-PO-CO MAPPING MATRIX								
PO & PSO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03
CO								
CO01	2	2	3	2	2	3	1	2
CO02	1	2	2	1	2	3	2	1
CO03	2	2	3	1	2	3	1	2
CO04	1	2	2	-	3	3	2	-
CO05	2	2	3	2	3	3	3	2

CORE PRACTICAL III

PROGRAMMING IN JAVA (P)

Objective : To Impart Practical Training in Java Programming Language

1. Write a program to sort the given numbers using arrays.
2. Write a program to implement the FIND and REPLACE operations in the given multiple text.
3. Write a program to implement a calculator to perform basic arithmetic Operations.
4. Write a program to find the area of a rectangle using constructor
5. Write a program to find the student's percentage and grade using command line arguments.
6. Write a program to draw circle or triangle or square using polymorphism and inheritance.
7. Implement multiple inheritance concepts in java using interface, you can choose your own example of a company or education institution or a general concept which requires the use of interface to solve a particular problems.
8. Write a program to create threads and assign priorities to them
9. Write a program to develop an applet to play multiple audio clips using multithreading.
10. Write a program to create a window with three check boxes called red, green and blue. The applet should change the colors according to the selection.

Semester: III	Core Practical : III	Programming In Java (P)	Credit : 2	Allotted hours per week: 3
----------------------	---------------------------------	------------------------------------	-------------------	---

CO01: Create a program using utility packages.

CO02: Demonstrated applet programming with five life cycles.

CO03: Difference between string class and string buffer class with examples.

CO04: Constructor, polymorphism and inheritance.

CO05: Using interface, multithreading.

PSO-PO-CO MAPPING MATRIX								
PO & PSO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03
CO								
CO01	2	2	2	3	3	3	2	2
CO02	2	2	1	3	3	3	2	2
CO03	2	2	2	2	2	3	2	2
CO04	2	2	2	3	3	3	3	2
CO05	2	2	3	2	2	3	2	2

CORE COURSE IV

DATABASE SYSTEMS

Objective : To provide the basic concepts of the Database Systems including Data Models, Storage Structure, Normalization and SQL

Unit I

Introduction: Database-System Applications- Purpose of Database Systems - View of Data -- Database Languages - Relational Databases - Database Design -Object-Based and Semi structured Databases - Data Storage and Querying Transaction Management -Data Mining and Analysis - Database Architecture - Database Users and Administrators - History of Database Systems.

Unit II

Relational Model: Structure of Relational Databases - Fundamental Relational-Algebra Operations Additional Relational-Algebra Operations- Extended Relational-Algebra Operations - Null Values - Modification of the Database.

Unit III

SQL: Data Definition - Basic Structure of SQL Queries - Set Operations-Aggregate Functions - Null Values- Nested Subqueries - Complex Queries - Views -Modification of the Database - Joined Relations - SQL Data Types and Schemas - Integrity Constraints -Authorization - Embedded SQL

Unit IV

Relational Languages: The Tuple Relational Calculus - The Domain Relational Calculus - Query-by- Example. Database Design and the E-R Model: Overview of the Design Process - The Entity-Relationship Model - 3 Constraints - Entity-Relationship Diagrams - Entity-Relationship Design Issues - Weak Entity Sets - Database Design for Banking Enterprise

Unit V

Relational Database Design: Features of Good Relational Designs - Atomic Domains and First Normal Form - Decomposition Using Functional Dependencies - Functional-Dependency Theory - Decomposition Using Functional Dependencies - Decomposition Using Multivalued Dependencies-More Normal Forms - Database-Design Process

Text Book:

1. Database System Concepts, Sixth edition, Abraham Silberschatz , Henry F. Korth, S. Sudarshan, McGraw-Hill-2010.

Reference Books:

1. Database Systems: Models, Languages, Design and Application, Ramez Elmasri, Pearson Education, 2014.

Semester: IV	Core Course : IV	Database Systems	Credit : 5	Allotted hours per week: 5
---------------------	-----------------------------	-------------------------	-------------------	---------------------------------------

CO01: Principles of DBMS - (DML,DDI,TCL)

CO02: Understanding normalization namely first normal form, second normal form, third normal form, BCNF..

CO03: To identify the different types of Keys(foreign key,super key)

CO04: Explain the functional dependencies and multi-valued dependencies

CO05: Identify the ER- Diagram, Relationship concepts and fundamentals of relational algebra and calculus.

PSO-PO-CO MAPPING MATRIX								
PO & PSO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03
CO								
CO01	2	3	3	1	3	3	1	2
CO02	2	3	2	2	2	3	2	3
CO03	1	2	1	1	1	3	1	2
CO04	2	1	2	2	1	3	2	3
CO05	2	2	2	1	2	3	2	1

CORE PRACTICAL IV
DATABASE SYSTEMS (P)

Objective : To Impart Practical Training in MySQL

1. Create a table and perform the following basic mysql operations
 - a) Set the primary key
 - b) Alter the structure of the table
 - c) Insert values
 - d) Delete values based on constraints
 - e) Display values using various forms of select clause
 - f) Drop the table

2. Develop mysql queries to implement the following set operations
 - a) Union
 - b) Union all
 - c) Intersect
 - d) Intersect all

3. Develop mysql queries to implement the following aggregate functions
 - a) Sum
 - b) Count
 - c) Average
 - d) Maximum
 - e) Minimum
 - f) Group by clause & having clause

4. Develop mysql queries to implement following join operations
 - a) Natural join
 - b) Inner join

- c) Outer join-left outer, right outer, full outer
 - d) Using join conditions
5. Develop mysql queries to implement nested subqueries
- a) Set membership (int, not int)
 - b) Set comparison (some, all)
 - c) Empty relation (exists, not exists)
 - d) Check for existence of Duplicate tuples(unique, not unique)
6. Develop mysql queries to create a views and expand it.

Semester: IV	Core Practical : IV	Database Systems (P)	Credit : 2	Allotted hours per week: 3
---------------------	--------------------------------	-----------------------------	-------------------	---------------------------------------

CO01: Create, alter and drop structure of a database using different constraints.

CO02: Insert, modifying and deleting of a particular or group records.

CO03: Select statement using aggregate functions, join operations, sorting, nested Sub queries.

CO04: Join Operations, Nested Sub queries.

CO05: Views.

PSO-PO-CO MAPPING MATRIX								
PO & PSO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03
CO								
CO01	2	1	2	2	3	3	2	2
CO02	2	1	2	2	3	3	2	2
CO03	2	1	2	2	3	3	2	2
CO04	2	1	2	2	2	3	3	2
CO05	2	1	2	2	2	3	3	3

CORE COURSE V
DATA STRUCTURES AND ALGORITHMS

Objective: To understand the concepts of Data Structures and Algorithms.

Unit I

Arrays and sequential representations – ordered lists – Stacks and Queues – Evaluation of Expressions – Multiple Stacks and Queues – Singly Linked List – Linked Stacks and queues – Polynomial addition.

Unit II

Trees – Binary tree representations – Tree Traversal – Threaded Binary Trees – Binary Tree Representation of Trees – Graphs and Representations – Traversals, Connected Components and Spanning Trees – Shortest Paths and Transitive closure – Activity Networks – Topological Sort and Critical Paths.

Unit III

Algorithms – Priority Queues - Heaps – Heap Sort – Merge Sort – Quick Sort – Binary Search – Finding the Maximum and Minimum.

Unit IV

Greedy Method : The General Method – Optimal Storage on Tapes – Knapsack Problem – Job Sequencing with Deadlines – Optimal Merge Patterns.

Unit V

Back tracking: The General Method – The 8-Queens Problem – Sum of Subsets – Graph Coloring.

Text Books:

1. Fundamentals of Data Structure – Ellis Horowitz, Sartaj Sahni, Galgotia Publications, 2008
2. Computer Algorithms – Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, University Press, 2008.

Reference Book:

1. Data Structures – Seymour Lipschutz, Tata Mcgraw Hill, Schaum's Outline Series, 2014

Semester: V	Core Course : V	Data structures and algorithms	Credit : 5	Allotted hours per week: 5
--------------------	----------------------------	---	-------------------	---------------------------------------

CO01: Explain the linear data structures(stack, queues and linked list)

CO02: Explain the non-linear structures(trees and graphs)

CO03: Describe about the divide and conquer techniques(sorting)

CO04: Illustrate and analyse the greedy method(knapsack problem)

CO05: Prove that Backtracking method (8-Queens problem, sum of subsets)

PSO-PO-CO MAPPING MATRIX								
PO & PSO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03
CO								
CO01	3	3	2	2	2	3	3	2
CO02	2	1	2	1	1	3	2	1
CO03	2	2	2	2	2	3	1	2
CO04	1	1	1	1	1	3	2	1
CO05	2	2	2	2	2	3	1	2

CORE COURSE VI OPERATING SYSTEMS

Objective: To provide the Fundamental Concepts in an Operating System.

Unit I Introducing Operating Systems

Introduction - What Is an Operating System-Operating System Software -A Brief History of Machine Hardware -Types of Operating Systems -Brief History of Operating System Development-Object-Oriented Design

Unit II Memory Management

Early Systems: Single-User Contiguous Scheme -Fixed Partitions-Dynamic Partitions-Best-Fit versus First-Fit Allocation -Deallocation - Relocatable Dynamic Partitions. Virtual Memory: Paged Memory Allocation-Demand Paging-Page Replacement Policies and Concepts - Segmented Memory Allocation-Segmented/Demand Paged Memory Allocation - Virtual Memory-Cache Memory

Unit III Processor Management

Overview-About Multi-Core Technologies-Job Scheduling Versus Process Scheduling-Process Scheduler-Process Scheduling Policies-Process Scheduling Algorithms -A Word About Interrupts-Deadlock-Seven Cases of Deadlock -Conditions for Deadlock-Modeling Deadlock-Strategies for Handling Deadlocks -Starvation - Concurrent Processes: What Is Parallel Processing-Evolution of Multiprocessors-Introduction to Multi-Core Processors-Typical Multiprocessing Configurations--Process Synchronization Software

Unit IV Device Management

Types of Devices-Sequential Access Storage Media-Direct Access Storage Devices-Magnetic Disk Drive Access Times- Components of the I/O Subsystem- Communication among Devices-Management of I/O Requests

Unit: V File Management

The File Manager -Interacting with the File Manager -File Organization - Physical Storage Allocation -Access Methods-Levels in a File Management System - Access Control Verification Module

Text Book:

1. Understanding Operating Systems, Ann McIver McHoes and Ida M. Flynn, Course Technology, Cengage Learning, 2011

Reference Book:

2. Operating Systems, Achyut Godbole and Atul Kahate, McGraw Hill Publishing, 2010.

Semester: V	Core Course : VI	Operating Systems	Credit : 5	Allotted hours per week: 5
--------------------	-----------------------------	--------------------------	-------------------	---------------------------------------

CO01: Understanding and Recognizing the various types of operating system.

CO02: Explaining, Discuss, Compare and Contrast the various scheduling algorithms.

CO03: Describing, Compute and choose the correct scheduling algorithm for the given problem.

CO04: Understanding the Deadlock concepts and Memory Management Techniques.

CO05: Discussing the concepts of file systems and mass storage structure, explain the different allocation methods

PSO-PO-CO MAPPING MATRIX								
PO & PSO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03
CO								
CO01	3	2	1	1	1	3	3	3
CO02	2	2	2	2	1	2	2	1
CO03	3	1	1	1	-	2	2	2
CO04	1	2	2	1	2	3	1	1
CO05	2	1	1	2	-	3	2	2

CORE COURSE VII
DIGITAL COMPUTER FUNDAMENTALS

Objective : To understand the concepts in Digital Computer System

Unit I

Number Systems and Codes: Binary Number System – Binary to Decimal Conversion – Decimal to Binary Conversion – Binary Addition – Binary Subtraction – Binary Multiplication and Division – Octal Numbers – Hexadecimal Numbers – Binary Codes – Error Detecting Codes – Error Correcting Codes.

Unit II

Logic Gates and Circuits: Boolean Algebra and Logic Gates – AND, OR, NOT, NAND, NOR, Exclusive OR and Exclusive OR Gates – Applications of XOR Gate – The Exclusive NOR Gate – Positive and Negative Logic – Logic Characteristics – Bipolar Logic Families – Integrated Circuits – Boolean Algebra: Definitions – Fundamentals of Boolean Algebra – Boolean Functions – Minterms and Maxterms – Laws and Theorems of Boolean Algebra – DeMorgan's Theorem – Universal Building Blocks (UBB) – NAND Gate as UBB – NOR Gate as UBB.

Unit III

Boolean Algebra: Simplifying Logic Circuits – Sum of Products – AND-OR Networks – Sum of Products and Product of Sums Forms – Karnaugh Maps – Product of Sums Simplification – NAND and NOR Implementation – AND-OR-INVERT Implementation – OR-AND-INVERT Implementation – Don't Care Conditions – Overlapping Groups – Rolling the Map – Eliminating Redundant Groups.

Unit IV

Combinational Logic Circuits: Introduction – Adders – The Half Adder – The Full Adder – Subtractors – BCD Adder – Multiplexers – Demultiplexers – Decoders – Encoders – Floating Point Number System – Range of Stored Numbers.

Unit V

Sequential Logic Circuits: Flip Flops – RS Flip Flop – Clocked RS Flip Flop – D Flip Flop – JK Flip Flop – T Flip Flop – Triggering of Flip Flops – Master Slave Flip Flop – Conversion of D Flip Flop – Conversion of T Flip Flop – Transfer Circuit – Clock – Counters and Shift Registers: Counters – Asynchronous or Ripple Counter – Ring Counter – Twisted Ring Counter – State

Diagrams and State Tables – Magnitude Comparator – Programmable Arrays of Logic Cells – Shift Registers.

Text Book:

1. Principles of Digital Electronics, Dr. K. Meena, PHI Learning Private Limited, New Delhi, 2009.

Reference Book:

1. Digital Logic Design, M. Morris Mano, Pearson Education, 2010

Semester: V	Core Course : VII	Digital Computer Fundamentals	Credit : 5	Allotted hours per week: 5
--------------------	------------------------------	--	-------------------	---------------------------------------

CO01: Learn the idea of number systems.

CO02: Acquire the knowledge of truth table and its gates.

CO03: Information about sequential and logical circuits. .

CO04: Knowledge of Combinational circuit

CO05: Fundamentals of Boolean algebra.

PSO-PO-CO MAPPING MATRIX								
PO & PSO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03
CO								
CO01	2	2	2	2	3	3	2	1
CO02	1	2	1	1	1	2	2	2
CO03	2	2	2	1	2	3	1	2
CO04	1	3	1	2	1	2	1	1
CO05	1	2	1	1	1	3	2	1

CORE PRACTICAL V
COMPUTER GRAPHICS AND ANIMATION (P)

Objective : To Impart Practical Training in Computer Graphics and Animation related problems

Photoshop :

1. (i) Handling different file formats and interchanging them, changing the resolution, color, grayscales and size of the images
(ii) Using brushes and creating multicolor real life images
2. Cropping, rotating, overlapping, superimposing, pasting photos on a page
3. Creation of a single image from selected portions of many
4. Developing a commercial brochure with background tints
5. Creating an image with multi-layers of images and texts.
6. Applying masks and filtering on images

Flash :

Develop an image(s) and do the following.

1. Basic Drawing and Painting
2. Working with Strokes and Fills
3. Creating Custom Colors, Gradients, and Line Styles Transforming and Grouping Objects
4. Creating and Managing Multiple Layers
5. Converting Text into Shapes
6. Animate using motion, shape, Tweening, and actions

Semester: V	Core Practical : V	Computer Graphics and Animation (P)	Credit : 3	Allotted hours per week: 4
--------------------	-------------------------------	--	-------------------	---------------------------------------

CO01: Basic drawing and editing knowledge.

CO02: Identification of basic 2D drawing.

CO03: Creation of Animation in different type.

CO04: Commercial brochure with background tints, Managing Multiple Layers.

CO05: Masks and filtering, motion, shape, Tweening, and actions.

PSO-PO-CO MAPPING MATRIX								
PO & PSO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03
CO								
CO01	1	1	2	1	2	3	2	1
CO02	2	2	2	2	3	3	1	2
CO03	2	1	2	2	2	3	2	3
CO04	3	2	1	1	3	3	3	2
CO05	3	2	1	2	1	3	3	1

MAJOR BASED ELECTIVE - I

SOFTWARE ENGINEERING

Objective: To provide knowledge of the various phases of Software Engineering Process

Unit I

Introduction : Introduction to Software Engineering - Software Process - Software Process Models - Software Model - Requirements Engineering Principles : Requirements Engineering - Importance of Requirements - Types of Requirements - Steps involved in Requirements Engineering

Unit II

Requirements Analysis Modeling : Analysis Modeling Approaches - Structured Analysis - Object Oriented Analysis - Design and Architectural Engineering : Design Process and Concepts - Basic Issues in Software Design - Characteristics of Good Design - Software Design and Software Engineering - Function Oriented System vs Object Oriented System - Modularity, Cohesion, Coupling, Layering - Real Time Software Design - Design Models - Design Documentation

Unit III

Object Oriented Concepts : Fundamental Parts of Object Oriented Approach - Data Hiding and Class Hierarchy Creation - Relationships - Role of UML in OO Design - Design Patterns - Frameworks - Object Oriented Analysis - Object Oriented Design - User Interface Design : Concepts of User Interface - Elements of User Interface - Designing the User Interface - User Interface Evaluation - Golden Rules of User Interface Design - User Interface Models - Usability

Unit IV

Software Coding - Introduction to Software Measurement and Metrics - Software Configuration - Project Management Introduction - Introduction to Software Testing - Software Maintenance

Unit V

Web Engineering : Introduction to Web - General Web Characteristics - Web Application Categories - Working of Web Application - Advantages and Drawbacks of Web Applications - Web Engineering - Emerging Trends in Software Engineering - Web 2.0 - Rapid Delivery - Open Source Software Development - Security Engineering - Service Oriented Software Engineering - Web Service - Software as a Service - Service Oriented Architecture - Cloud

Computing - Aspect Oriented Software Development - Test Driven Development - Social Computing

Textbook:

1. Software Engineering, Chandramouli Subramanian, Saikat Dutt, Chandramouli Seetharaman, B.G. Geetha, Pearson Publications, 2015

Reference Books:

1. Software Engineering, Jibitesh Mishra, Pearson Education, 2011

Semester: V	Major Based Elective - I	Software Engineering	Credit : 5	Allotted hours per week: 5
--------------------	-------------------------------------	-----------------------------	-------------------	---------------------------------------

CO01: Learn the phases of software development

CO02: Develop process models and process system models

CO03: Gather, understand, analyze and specify requirements

CO04: Develop architectural diagram, and implement by following coding principles

CO05: Apply testing strategies and handle software product maintenance issues

PSO-PO-CO MAPPING MATRIX								
PO & PSO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03
CO								
CO01	3	3	3	3	3	3	3	1
CO02	2	2	2	2	1	3	2	2
CO03	2	2	1	1	2	3	2	2
CO04	3	3	1	2	1	3	3	2
CO05	3	3	2	2	2	3	3	3

CORE COURSE-VIII

COMPUTER NETWORKS

Objective: To understand the Design and Organization of Computer Networks

Unit I

Overview and Physical Layer: Introduction: Data Communications - Networks - Network Types, Network Models: TCP/IP Protocol Suite- The OSI Model, Bandwidth utilization : Multiplexing-Spread Spectrum, Transmission Media: Guided Media-Unguided Media, Switching: Circuit Switched Network-Packet Switching-Structure of a switch

Unit II

DataLinkLayer:Error Deduction and Correction : Introduction- Cyclic codes- Forward error correction, Data link Control: Datalink layer protocols- Media Access Control: Random Access-Controlled Access, Wireless Networks: IEEE 802.11- Bluetooth-Cellular Telephone- Satellite network- Connection devices,

Unit III

Network Layer Services : Packet Switching- Network layer performance- IPV4 Addresses- Internet Protocol-Routing Algorithms - IPV6 Addressing

Unit IV

Transport Layer : Transport Layer Protocols- User Datagram Protocol - TCP:TCP Services TCP features - Windows in TCP - Flow Control - Error Control- TCP Congestion Control - TCP timers

Unit V

Application Layers : Client Server Programming - Word Wide Web & HTTP - FTP - Email - DNS

Text Book:

1. Data Communications and Networking, Behrouz A Forouzan, Tata McGraw Hill, Fifth Edition, 2013

Reference Book:

1. Data Communications and Networks, Achyut Godbole and Atul Kahate, McGraw Hill Education, 2011

Semester: VI	Core Course : VIII	Computer Networks	Credit : 6	Allotted hours per week: 6
---------------------	-------------------------------	--------------------------	-------------------	---------------------------------------

CO01: Explain the fundamental knowledge in Network.

CO02: Hardware and Software; summarize OSI reference Model.

CO03: Describe about the types of Transmission Media. Relate and illustrate the techniques of Error Detection and Correction.

CO04: Illustrate and analyses the Routing and Congestion Control Algorithms in Network Layer; explain the underlying protocol in Transport Layer.

CO05: Identify the functionality of Application Layer services

PSO-PO-CO MAPPING MATRIX								
PO & PSO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03
CO								
CO01	3	2	3	2	2	3	2	2
CO02	2	3	2	2	2	3	3	3
CO03	3	2	2	3	1	3	2	2
CO04	2	2	2	1	2	3	1	1
CO05	3	3	3	3	1	3	3	3

CORE COURSE IX PROGRAMMING IN PHP

Objective : To understand the Concepts of PHP and Ajax.

Unit I

Essentials of PHP - Operators and Flow Control - Strings and Arrays.

Unit II

Creating Functions - Reading Data in Web Pages - PHP Browser - Handling Power.

Unit III

Object-Oriented Programming –Advanced Object-Oriented Programming.

Unit IV

File Handling –Working with Databases – Sessions, Cookies, and FTP.

Unit V

Ajax – Advanced Ajax – Drawing Images on the Server.

Text Book:

1. The PHP Complete Reference, Steven Holzner, McGraw Hill Education, 2007

Reference Books:

1. PHP: A Beginner's Guide, Vikram Vaswani, McGraw Hill Education, 2008

Semester: VI	Core Course : IX	Programming In PHP	Credit : 6	Allotted hours per week: 6
-------------------------	-------------------------	---------------------------	-------------------	---------------------------------------

CO01: Basic Program creation idea with logic.

CO02: Logical and looping statement knowledge.

CO03: Update the knowledge of basic concept of oops and Advanced oops concepts.

CO04: Gather knowledge for creating web forms and read the data from the web forms also store with database.

CO05: Basic idea and concept for drawing through coding and fundamental knowledge of
AJAX.

PSO-PO-CO MAPPING MATRIX								
PO & PSO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03
CO								
CO01	3	2	2	2	3	3	3	3
CO02	2	3	2	2	2	3	2	2
CO03	3	2	2	3	3	3	2	1
CO04	3	3	3	3	3	3	1	3
CO05	2	2	1	2	2	3	2	1

CORE PRACTICAL VI

PROGRAMMING IN PHP (P)

Objective : To Impart Practical Training in PHP Programming Language

1. Write a program to find the factorial of a number.
2. Write a program using Conditional Statements.
3. Write a program to find the maximum value in a given multi dimensional array.
4. Write a program to find the GCD of two numbers using user-defined functions.
5. Design a simple web page to generate multiplication table for a given number.
6. Design a web page that should compute one's age on a given date.
7. Write a program to download a file from the server.
8. Write a program to store the current date and time in a COOKIE and display the 'Last Visited' date and time on the web page.
9. Write a program to store page views count in SESSION, to increment the count on each refresh and to show the count on web page.
10. Write a program to draw the human face.
11. Write a program to design a simple calculator.
12. Design an authentication web page in PHP with MySQL to check username and password.

Semester: VI	Core Practical : VI	Programming in PHP (P)	Credit : 3	Allotted hours per week: 4
---------------------	--------------------------------	-------------------------------	-------------------	---------------------------------------

CO01: Basic fundamental knowledge of programme creation.

CO02: Used to develop the code to get the information from form, session, cookies and databases.

CO03: Acquire the knowledge about data transmission between pages.

CO04: Basic Drawings in PHP.

CO05: PHP with MySQL.

PSO-PO-CO MAPPING MATRIX								
PO & PSO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03
CO								
CO01	3	2	2	2	2	3	2	2
CO02	3	2	1	1	1	3	2	1
CO03	2	2	2	2	2	2	2	1
CO04	2	2	1	2	2	3	1	2
CO05	2	2	2	2	2	3	3	3

MAJOR BASED ELECTIVE II

MOBILE COMPUTING

Objective : To understand the Architectures, Synchronization Process and Operating Systems in Mobile Computing

Unit I

Mobile Communications - An Overview : Mobile Computing - Mobile Computing Architecture - Mobile Devices - Mobile System Networks - Data Dissemination - Mobility Management - Security

Unit II

Mobile Devices and Systems : Mobile Phones - Digital Music Players - Handheld Pocket Computers - Handheld Devices with Operating Systems - Smart Systems - Limitations of Mobile Devices - Automotive Systems

Unit III

GSM and Similar Architectures : GSM Services and System Architecture - Radio Interfaces - Protocols - Localization - Calling - Handover - Security - New Data Devices - General Packet Radio Service - High Speed Circuit Switched Data

Unit IV

Data Synchronization in Mobile Computing Systems : Synchronization - Synchronization Software for Mobile Devices - Synchronization Protocols - Mobile Devices Server and Management : Mobile Agent - Application Server - Gateways - Portals - Service Discovery - Device Management - Mobile File Systems - Security

Unit V

Mobile Operating Systems : Operating System - Palm OS - Windows CE - Symbian OS - Linux for Mobile Devices

Text Book:

1. Mobile Computing, Rajkamal, Oxford University Press, 2011.

Reference Book :

1. Mobile Computing, KumkumGarg, Pearson Education, 2010

Semester: VI	Major Based Elective II	Mobile Computing	Credit : 6	Allotted hours per week: 6
---------------------	------------------------------------	-------------------------	-------------------	---------------------------------------

CO01: Understand fundamentals of wireless communication

CO02: Analyze security, energy efficiency, mobility, scalability and their unique characteristics in wireless networks.

CO03: Demonstrate basic skills for cellular networks design.

CO04: Apply knowledge of TCP/IP extension for mobile and wireless networks.

CO05: Explain about GPS and GPRS.

PSO-PO-CO MAPPING MATRIX								
PO & PSO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03
CO								
CO01	3	2	3	2	-	3	2	2
CO02	2	2	2	2	-	3	3	3
CO03	3	2	2	2	-	3	2	2
CO04	2	2	2	2	-	3	2	2
CO05	3	3	3	3	1	3	3	3

MAJOR BASED ELECTIVE III

Mini Project

Semester: VI	MAJOR BASED ELECTIVE III	Mini Project	Credit : 6	Allotted hours per week: 6
---------------------	-------------------------------------	---------------------	-------------------	---------------------------------------

Students are asked to do a project work in a group of maximum of 4 members. They can take any commercial application as their project and will collect the data from the concerned firm or organization. At the end of the project they will submit a report about the project. Internal Guides will be allocated for the students to undergo and clarify the doubts about the project. Viva voce exam will conducted at the end of the semester by the external and internal examiners.

CO01. Develop a functional application based on the software design

CO02. Apply coding, debugging and testing tools to enhance the quality of the software

CO03. Construct new software system based on the theory and practice gained through this exercise

CO04. Prepare the proper documentation of software projects following the standard guidelines

CO05. Learn technical report and oral presentation skills

PSO-PO-CO MAPPING MATRIX								
PO & PSO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03
CO								
CO01	3	3	3	3	3	3	3	2
CO02	2	2	2	3	2	3	3	2
CO03	2	3	3	2	2	3	3	3
CO04	3	2	3	2	2	3	3	3
CO05	2	3	3	2	3	3	3	2