ALAGAPPA UNIVERSITY, KARAIKUDI
NEW SYLLABUS UNDER CBCS PATTERN (w.e.f.2014-15)

B.Sc., COMPUTER SCIENCE – PROGRAMME STRUCTURE

Sem	Course			Cr.	Hrs./ Week	Marks		Total
	Part	Subject Code	Name			Int.	Ext.	
I	I	411T	**Tamil/other languages – I**	3	6	25	75	100
	II	412E	**English – I**	3	6	25	75	100
	III	4BCE1C1	**Core – I** – Programming in C	4	6	25	75	100
	III	4BCE1P1	**Core – II** – Programming in C Lab	4	6	40	60	100
	III		**Allied – I**	5	5	25	75	100
	IV	4NME1A / 4NME1B / 4NME1C	**(1) Non-Major Elective– I** – (a) jkpo; nkhopapd; mbg;gilfs;;;/ (b) ,f;fhy ,yf;fpak/; (c) Communicative English	2	1	25	75	100
			Total	**21**	**30**	**--**	**--**	**600**
II	I	421T	**Tamil/other languages – II**	3	6	25	75	100
	II	422E	**English – II**	3	6	25	75	100
	III	4BCE2C1	**Core – III** – Programming in C++ and Data Structures	4	6	25	75	100
	III	4BCE2P1	**Core – IV** – Data Structure Lab using C++	4	5	40	60	100
	III		**Allied – II**	5	5	25	75	100
	IV	4BES2	**(3) Environmental Studies**	2	2	25	75	100
			Total	**21**	**30**	**--**	**--**	**600**
III	I	43IT	**Tamil/other languages – III**	3	6	25	75	100
	II	432E	**English – III**	3	6	25	75	100
	III	4BCE3C1	**Core – V** – Java Programming	4	5	25	75	100
	III	4BCE3P1	**Core – VI** – Java Programming Lab	4	5	40	60	100
	IV		**Allied – III**	5	5	25	75	100
	IV	4NME3A / 4NME3B / 4NME3C	**(1) Non-major Elective– II** – (a) ,yf;fpaKk; nkhopg; gad;ghLk; / (b) goe;jkpo; ,yf;fpaq;fSk; ,yf;fpa tuyhWk;/ (c) Effective Employability Skills	2	1	25	75	100
		4SBS3A1/ 4SBS3A2	**(2) Skill Based Subjects – I**	2	2	25	75	100
	V	4BEA3	**Extension activities**	1	-	100	--	100
			Total	**24**	**30**	**--**	**--**	**800**
IV	I	441T	**Tamil/other languages – IV**	3	6	25	75	100
	II	442E	**English – IV**	3	6	25	75	100
	III	4BCE4C1	**Core – VII** – Web Design Technology	4	4	25	75	100
	III	4BCE4P1	**Core – VIII –** Web Design Lab	4	5	40	60	100

	III		**Allied – IV**	5	5	25	75	100
	IV	4SBS4B1/ 4SBS4B2	**(2) Skill Based Subjects – II**	2	2	25	75	100
	IV	4BVE4/ 4BMY4/ 4BWS4	**(4) Value Education / Manavalakalai Yoga / Women's Studies**	2	2	25	75	100
	Total			**23**	**30**	**--**	**--**	**700**
V	III	4BCE5C1	**Core – IX** – Operating System	4	5	25	75	100
	III	4BCE5C2	**Core – X** – Visual Basic	4	5	25	75	100
	III	4BCE5P1	**Core – XI** – Visual Basic and Oracle Lab	4	6	40	60	100
	IV	4BCEE1A/ 4BCEE1B	**Elective – I** – Data Mining and Data Warehousing **(or)** Multimedia Technology	5	5	25	75	100
	III	4BCEE2A/ 4BCEE2B	**Elective – II** – Database Management System **(or)** Advanced Java Programming	5	5	25	75	100
	IV	4SBS5A3/ 4SBS5A4/ 4SBS5A5	**(2) Skill Based Subjects – I**	2	2	25	75	100
			(2) Skill Based Subjects – I	2	2	25	75	100
	Total			**26**	**30**	**--**	**--**	**700**
VI	III	4BCE6C1	**Core – XII –** Computer Networks	4	5	25	75	100
	III	4BCE6C2	**Core – XIII** – Computer Graphics	4	5	25	75	100
	III	4BCE6C3	**Core – XIV** – Software Engineering	4	5	25	75	100
	III	4BCE6P1	**Core – XV – C# .**Net Lab	4	6	40	60	100
	III	4BCEE3A / 4BCEE3B	**Elective – III –** Mobile Communication **(or)** C# .Net Programming	5	5	25	75	100
	IV	4SBS6B3/ 4SBS6B4/ 4SBS6B5	**(2) Skill Based Subjects – II**	2	2	25	75	100
			(2) Skill Based Subjects – II	2	2	25	75	100
Total				**25**	**30**	**--**	**--**	**700**
Grand Total				**140**	**180**	**--**	**--**	**4100**

I YEAR – I SEMESTER
COURSE CODE: 4BCE1C1

CORE COURSE I – PROGRAMMING IN C

Unit I

Overview of C: History of C – Importance of C – Basic structure of C programs and Executing. **Constants, Variables and Data types:** Character set – C Tokens – Keywords and identifiers – Constants – Variables – Data types – Declaration of variables and storage classes – Assigning values to variables – Defining symbolic constants. **Operators and Expression:** Operators – Evaluation of expressions – Precedence of arithmetic operators – Type conversions in expressions – Operator precedence and associatively – Mathematical functions. **Managing Input and Output Operations:** Reading and writing a character – Formatted input and output.

Unit II

Decision Making and Branching: Simple IF, IF-ELSE, Nesting of IF-ELSE, ELSE-IF ladder, Switch statements – GOTO statements. **Decision Making and Looping:** WHILE statement – DO statement – FOR statement – Jumps in loops. **Arrays:** Definition, Declaration and Intialization– One dimensional – Two dimensional – Multi dimensional arrays – Dynamic arrays.

Unit III

Character arrays and strings: Introduction – Declaring and initializing string variables –Reading strings from terminal – Writing strings to screen – String handling functions – Table of strings. **User-Defined functions:** Introduction – Need for User-Defined function – A Multi- function program – Elements of User-Defined function – Definition of functions – Return values and their types – Function calls – Function declaration – All category of functions – Nesting of functions – Recursion – Passing arrays to functions – Passing strings to functions.

Unit IV

Structures and Unions: Introduction – Defining a structure – Declaring structure variables – Accessing structure members – Structure initialization – Copying and comparing structure variables – Arrays of structures – Arrays within structures – Structures within structures – Structures and functions – Unions – Size of structures – Bit fields.

Pointers: Introduction – Understanding pointers – Accessing the address of a variable – Declaring and Initializing of pointer variables – Chain of pointers – Pointer expressions – Pointers and arrays– Pointers and character strings – Arrays of pointers – Pointers as function arguments – Functions returning pointers – Pointers to functions – Pointer and structures.

Unit V

Dynamic Memory Allocation: malloc(), calloc(), realloc() **File Management:** Introduction – Defining and opening a file –Closing a file – Input/Output operation on files – Error handling during I/O operations – Random access files – Command line arguments. **The Preprocessor:** Introduction – Macro substitution – File inclusion – Compiler control directives.

Text Books

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

References

1. Theory and Problems of Programming with C, by Byron S.Gottfried, TATA McGRAW HILL
2. Programming in ANSI C, by D. Ravichandran, New Age International (P) Ltd.

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I YEAR – I SEMESTER
COURSE CODE: 4BCE1P1

CORE COURSE II – PROGRAMMING IN C LAB

Group – A

1. Write a C program to find whether a given number is Armstrong or not.
2. Write a C program to find whether a given number is Perfect or not.
3. Write a C program to find whether a given number is Adam or not.
4. Write a C program to solve the Quadratic Equation.
5. Write a C program to generate prime numbers within a range.
6. Write a C program to find sum of the digits and reverse the digits.
7. Write a C program to generate the Fibonacci series.
8. Write a C program to convert Binary to decimal and vice versa.
9. Write a C program to evaluate the SINE series and COS series.
10. Write C program to find the Factorial of a given number using function.
11. Write a C program to read the text and count the number of vowels, consonants, and digits in it.
12. Write a C program to convert the case of given string from upper case to lower case and vice versa
13. Write a C program to find whether the given string is Palindrome or not.

Group- B

1. Write a program to find the sum, average, standard deviation for the given N numbers.
2. Write a C program to Count the number of positives, negatives and zeroes.
3. Write a C program to Check whether the element is present in the given list or not.
4. Write a C program to Sort numbers in Ascending order.
5. Write a C program to Multiply two matrices and print the result in transpose form
6. Write a C program to Sort names in Alphabetical order.
7. Write a C program to Prepare a student's mark list using structure
8. Write a C program to Prepare a customer's electricity bill using structure
9. Write a C program to Sort numbers in ascending order using pointers
10. Write a C program to Prepare a Employee's salary bill using file processing
11. Write a C program to Count the number of lines, words, and characters in a text file.
12. Write a C program Merge two arrays of integers both with their elements in
13. Ascending order into a single ordered array.

Note:

One Question from Group A and another one Question from Group B is compulsory for University Examination.

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I YEAR – II SEMESTER
COURSE CODE: 4BCE2C1

CORE COURSE III – PROGRAMMING IN C++ AND DATA STRUCTURES

Unit I

Key Concepts and Benefits of Object Oriented Programming – **Input and Output in C++:** Streams – Stream classes – Unformatted and formatted console I/O operations – manipulators. **Introduction to C++**: Tokens, Keywords, Identifiers, Variables, Operators, Expressions and Control Structures. **Functions in C++**: Main Function – Function Prototyping – Parameters Passing in Functions – Values Return by Functions – inline Functions – Function Overloading.

Unit II

Classes and Objects: Specifying a Class, Defining Member Functions, Making an Outside Function Inline, Nesting of Member Functions, Private member Functions, Arrays within a class, Memory Allocation for Objects, Static Data Members, Static Member Functions, Array of Objects, Objects as Function Arguments, Friendly Functions, Returning Objects, Const Member Functions, Pointer to Members.

Constructor and Destructors: Introduction, Constructors, Parameterized Constructors, Multiple Constructors in a class, Constructors with Default Arguments – Dynamic Initialization of Objects, Copy Constructor, Dynamic Constructors, Constructing Two–Dimensional Arrays,Destructors.**Operator Overloading and Type Conversion:**Introduction, Defining Operator Overloading –Overloading Unary, Binary Operators – type conversion.

Unit III

Inheritance: Introduction, Defining Derived Class, Single Inheritance, Making Private Member inheritable, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Class, Abstract Classes – **Pointers, Virtual Functions and Polymorphism**: Introduction, pointers to objects, this pointer, pointers to Derived Classes, Virtual Functions, Pure Virtual Functions.

Unit IV

Stacks and Queues: Fundamentals –Evaluation of expressions. **Linked List:** Single Linked Lists – Linked Stacks and Queues -Doubly Linked List.

Unit V

Trees: Basic Terminology - Binary Trees - Binary Tree Representations - Binary Tree Traversal. **Graphs:** Terminology and Representations – Traversals.

Text Books

1. Object-Oriented Programming with C++, E.Balagurusamy, Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. Fundamentals of Data Structure by Ellis Horrowitz, Sartaj sahnia, Galhotia Publications.

Reference Books

1. Beginning C++ – The complete Language, Ivor Horton, Shroff Publishers and Distributors Pvt. Ltd.
2. Clifford A.Schaffer, A Practical introduction to Data structure & Algorithm Analysis, Prentice Hall of India 1997.
3. Alfred V.Aho, John E.Hopcroft and Jeffery D.Ullman, Data Structures & Algorithms, addition Wesley.

I YEAR – II SEMESTER
COURSE CODE: 4BCE2P1

CORE COURSE IV – DATA STRUCTURE LAB USING C++

Group – A

1. Write a program to find whether the given number is odd or even using class
2. Write a program to sort the integer array using Class .
3. Write a program to check whether the given string is palindrome or not using class
4. Write a program to exchange the content of two variables using call by reference
5. Write a program to calculate the volume of sphere, cone and cylinder using inline function
6. Write a program to perform the arithmetic operations using inline function
7. Write a program to find maximum and minimum from the given list of N numbers using nesting of member functions.
8. Write a program to overload operators using friend function
9. Write a program to find the sum of digits using constructor
10. Write a program to select the prime numbers from the given list using constructor overloading.
11. Write a program to calculate the volume of cone, sphere and cylinder using function overloading
12. Write a program for addition and subtraction of complex numbers using operator overloading
13. Write a program to compare two objects values using overload relational operator

Group B

1. Write a program to prepare the electricity bill for N customers using array of objects.
2. Write a program for counting even and odd numbers using pointers to objects
3. Write a program to perform the matrix addition, subtraction, and multiplication using single level inheritance
4. Write a program to prepare the student mark list and bio-data using multilevel inheritance
5. Write a program to display the courses with corresponding subject and their fees details using virtual base class
6. Write a program to check the eligibility of students for medical and engineering seat using virtual function.
7. Write a program to perform the stack operations using arrays
8. Write a program to perform the queue operations using arrays
9. Write a program to perform the stack operations using linked lists
10. Write a program to perform the queue operations using linked lists
11. Write a program to search an element in a linked list
12. Write a program to implement singly linked list (creation, insertion and deletion)
13. Write a program to Convert an Infix Expression to Postfix Expression using Arrays.
14. Write a program to implement Doubly Linked List (creation, insertion and deletion)
15. Perform all Tree Traversals for a Binary Tree using Arrays and Recursive.

Note:

One Question from Group A and another one Question from Group B is compulsory for University Examination.

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II YEAR – III SEMESTER
COURSE CODE: 4BCE3C1

CORE COURSE V – JAVA PROGRAMMING

Unit I

Java Evolution:

Java History – Java Features – Java and Internet – World Wide Web – Web Browsers – H/W and S/W requirements – Java Support Systems – Java Environment.

Overview of Java language:

Introduction – Simple Java Program – Comments – Java Program Structure – Tokens – Java Statements – Implementing a Java Program – JVM – Command Line Arguments. Constants – Variables – Data Types – Type Casting.

Unit II

Operators and Expressions:

Arithmetic Operators – Relational, Logical, Assignment, Increment and Decrement, Conditional, Bitwise, Special Operators – Arithmetic expressions, Evaluation of expression – Precedence of Arithmetic Operators – Type Conversions – Operator Precedence and associativity – Mathematical Functions. **Decision Making and Branching:** If – if…..else – Nesting of if……. Else – else if – switch - ?: operator.**Decision Making and Looping:**
While – do – for – jump in loops – labeled loops.

Unit III

Classes, Objects and Methods:

Defining a class – Adding variables, methods – Creating objects – Accessing Class Members– Constructors – Methods overloading – static members – Nesting of Methods – Inheritance – Overriding methods – final Variables and methods – Final classes – finalizer methods – Abstract methods and classes – visibility control. **Arrays, Strings and Vectors:** Arrays – One Dimensional Arrays – Creating an array – Two Dimensional Arrays – Strings – Vectors – Wrapper Classes **Interfaces: Multiple Inheritance** Defining interfaces – Extending interfaces – implementing interfaces – Accessing interface variables.

Unit IV

Packages:

Java API Packages – Using system packages – Naming conventions – Creating Packages – Accessing a Package – Using a Package – Adding a Class to a Package – hiding classes.

Multithreaded Programming: Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread – Using Thread methods – Thread Exceptions – Thread Priority – Synchronization – Implementing the 'Runnable' Interface

Managing Errors and Exceptions: Types of errors – Exceptions – Syntax of Exception handling code – Multiple Catch Statements – Using finally statement – Throwing our own Exceptions – Using Exceptions for Debugging.

Unit V

Applet Programming:

How applets differ from Applications – preparing to write applets – Building Applet Code – Applet life cycle – creating an Executable Applet – Designing a Web Page – Applet Tag – Adding Applet to HTML file – Running the Applet – Passing parameters to Applets – Displaying Numerical values – Getting input from the user

Graphics Programming:
The Graphics Class – Lines and Rectangles – Circles and Ellipses – Drawing Arcs – Drawing Polygons – Line Graphs – Using Control Loops in Applets – Drawing Bar Charts.

Text Book

1. **"Programming with JAVA",** Second Edition 2006", **E. Balagurusamy,** TATA McGraw-Hill Publishing Company Limited, New Delhi

Reference Books

1. "**Java 2 – The Complete Reference**", Fifth Edition, 2006 **Herbert Schildt**, TATA Mc Graw Hill Publishing Company Limited, New Delhi.
2. "**Java – How to Program**", Sixth Edition 2005, **H.M. Deitel, P.J.Deitel**, Pearson Education Pvt. Ltd, Delhi.

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II YEAR – III SEMESTER
COURSE CODE: 4BCE3P1

CORE COURSE VI – JAVA PROGRAMMING LAB

Group –A

1. Program to calculate simple interest and compound interest using class.
2. Program to get a number and print that numbers in words(Ex: 1234 – One thousand two hundred and thirty four).
3. Write a program to Find out the total salary of a employee which having a 3 types of employ ,(using constructor overloading)
   Type 1- who are trainees and get only fixed salary .
   Type 2- who are getting net salary + HRA + DA.
   Type 3- who are getting net salary + HAR + DA – PF
4. Program to calculate area of Square and Rectangle using Method Overloading.
5. Program to remove the duplicate from an array.
6. Program to Encrypt and Decrypt the String using class.
7. Program to implement User-Defined Exception (minimum 3 types of exception should be used) .
8. Program to generate +ive Fibonacci and –ive Fibonacci series using Thread.
9. Applet Program to Displaying Digital Clock . (Ex: 09:15:45 AM)
10. Applet Program to Draw different shapes and fill with different color, receives input from user.
11. Applet Program to Draw our National Flag.
12. Applet Program to display different image with different styles of font.
13. Applet Program to Draw Bar Charts with different colors.
14. Applet Program to draw Building with attractive colors.

Group - B

1. Program to find sum, average and maximum and minimum of the given N numbers using class.
2. Program to implement stack operation using arrays.
3. Program to implement queue operation using arrays.
4. Program to perform Matrix Addition, Subtraction and Multiplication using class.
5. Program to perform the String operations. (Reverse, Copy, Concatenate, Compare)
6. Program to display student mark details using Single Inheritance.
7. Program to implement banking transaction using Interface.
8. Program to implement Multiple Thread.
9. Program to implement Package .
10. Applet Program to addition and multiplication of two numbers

Note:

One Question from Group A and another one Question from Group B is compulsory for University Examination.

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II YEAR – IV SEMESTER
COURSE CODE: 4BCE4C1

CORE COURSE VII – WEB DESIGN TECHNOLOGY

Unit I

Introduction to HTML: Markup Languages – editing HTML – common tags – header – text styling – linking – images – formatting text – special characters, horizontal rules and line breaks – unordered list – nested and ordered list – tables and formatting – forms – linking – frames.

Unit II

Cascading Style Sheets:

Introduction – Inline styles – Embedded Style Sheets – Conflicting Style – Linking External Style Sheets – Positioning Elements – Backgrounds – Element Dimension – Box Model and Text Flow – Media Types – Building a Dropdown menu

Unit III

Java Script: introduction – control structures – if structure – while structure – assignment operators – increment and decrement operators – for structure – switch structure – do/while structure – break and continue statement – logical operators

Unit IV

Java Script Functions: Programmer defined functions – function definitions – duration of identifiers – scope rules – recursion – recursion vs iteration – global functions

Java Script Arrays: Arrays – declaring and allocating arrays – references and reference parameters – passing arrays to functions – sorting arrays – searching arrays – multiple-subscripted arrays

Java Script Objects: Math object – String object – Date object – Boolean and Number Object – document object – window object.

Unit V

Document Object Model (DOM): Modeling a document – Traversing and modifying a DOM Tree – DOM collections and Dynamic styles.

JavaScript Events: Registering event handlers – event onclick and onload – event onmousemove, the event Object and this – on mouseover and on mouseout – onfocus and onblur – form processing with onsubmit and onreset – event bubbling and other events.

XML: Basics – structuring Data – XML Name Spaces – Document Type Definations – W3C XML schema documents – XML Vocabularies

Text Book

1. "Internet and World Wide Web – How to Program", H.M.Deitel, P.J.Deital, T.R.Nieto, Pearson Education Asia – Addison Wesley Longman Pte Ltd.

Reference Books

1. "Special edition using HTML", Mark R Brown and Jerry Honeycutt, Third edition

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II YEAR – IV SEMESTER
COURSE CODE: 4BCE4P1

CORE COURSE VIII – WEB DESIGN LAB

1. Create a HTML page for displaying the personal information by using various tags
2. Create a HTML page which includes images and audio for any application
3. Create a HTML page for displaying the tender notice
4. Create a HTML page for displaying your class time table
5. Create a HTML page for advertising the courses offered in your college using frames
6. Create a HTML page for advertising the opportunities for the job in a company
7. Create a HTML page for displaying your curriculum vitae
8. Create a web page depicting the application form for a college
9. Create a web page to advertise a product of a company using images and audio
10. Create a web page for displaying the results of a student
11. Create a web page for a web magazine
12. Create the Train time table web page
13. Create an online quiz which contains 15 objective type questions
14. Create an application form for online email registration
15. Create a dictionary using frames. The words are displayed on one frame and when clicked its meaning should be displayed in the other frame
16. Create a website for your College
17. Create a web site for a software company

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III YEAR – V SEMESTER
COURSE CODE: 4BCE5C1

CORE COURSE IX – OPERATING SYSTEM

Unit I

Introduction: Operating System – Batch System – Time Sharing – Personal Computer System– Parallel Systems – Real Time Systems – Distributed Systems – Computer System Operation – I/O Structure – Storage Structure – Storage Hierarchy – Hardware Protection – General System Architecture – System Components Operating System Services – System calls – system programs – system structure – virtual machines.

Unit II

Process Management: Process Concept – Process scheduling – operations on processes – cooperating processes – interprocess communication - CPU scheduling concepts – scheduling criteria – Scheduling Algorithms - Multiple processor scheduling – Real time scheduling – thread scheduling.

Unit III

process synchronization – critical section program – two task solutions – synchronization hardware – semaphores – classical synchronization – monitors – deadlocks – system model – deadlock characterization – methods for handling deadlocks – deadlock prevention – deadlock avoidance – deadlock detection – recovery from deadlock.

Unit IV

Storage Management: Memory Management – swapping – contiguous memory allocation – paging – segmentation with paging – Virtual Memory – Demand paging – Page replacement – Allocation of frames – Thrashing.

Unit V

File and I/O Management: File concepts – Access Methods – Directory structure – Allocation methods – Free space management – directory implementation – Efficiency and performance

Text Book

1. A Silberschatz Peter Galvin and Greg Gagne, “Operating System Concepts”, John Wiley & Sons, 2000

Reference books

1. Operating systems Internal and Design Principles – Fifth Edition, William Stallings, PHI
2. Operating systems – Second edition, Achyut S Godbole, TMH

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III YEAR – V SEMESTER
COURSE CODE: 4BCE5C2

CORE COURSE X – VISUAL BASIC

Unit I

Visual Basic: Variables – Constant – Arrays – Collections – Procedures – Subroutines, Functions, Calling Procedures – Arguments – Argument Passing Mechanisms, Using Optional Arguments, Passing an Unknown Number of Arguments, Named Arguments – Function Return Values – Returning Custom Data Type, Arrays, Error as Function Values – Control Flow Statements – If..Then, If..Then..Else, Select Case – Loop Statements – Do..Loop, For..Next, While..Wend – Nested Control Structures – The Exit Statement.

Unit II

Working With Forms: The Appearance of Forms – Start up, Loading, Showing and Hiding, Controlling – Designing Menus – Menu Editor, Programming Menu Commands, Using Access and Shortcut Keys, Manipulating Menus at Runtime – Building Dynamic form at Runtime. Basic ActiveX Controls – The Textbox Control – Basic Properties, Manipulating Control's Text, Text Selection, Search and Replace Operations, Capturing Keystrokes – The ListBox and Combo Box Control – Basic Properties, Control's methods, Indexing with the ListBox – Searching Sorted List, Combo Box Control – The ScrollBar and Slider Controls – ScrollBar Control, Slider Control – File Controls.

Unit III

Drawing with Visual Basic: Graphics Controls – Sizing Images, Loading and Saving Images, Setting Picture and Image Properties, Exchanging through Clipboard – Coordinate Systems – Scale properties and Methods, Twips Per Pixel X, Twips Per Pixel Y Properties, Current X Current Y Properties – Graphics Methods – Drawing Text, Line and Shapes, Filling Shapes, Circle Method, Drawing Modes, Drawing Curves

Unit IV

Advanced ActiveX Controls: The Common Dialogs Control – Usage, Properties, Color, Font, File Open and File Save Common Dialog Box, Multiple File Selection, Print and Help Common DialogBox – TreeView and List View – How Tree Structure work, ImageList, Using TreeView and List Control, Structuring Tree View Control, Viewing Folder's Files.
More Advanced ActiveX Controls: RichTextBox Control – RTFLanguage, Text Manipulation Properties, RichTextBox Control's MethodsTextFormating Properties – MSFlexGrid Control– Basic Properties, Data Entry – Multiple Document Interface – Basics, Built-in Capabilities, Parent and Child Menus – Accessing Child Forms.

Unit V

DataBase Programming: RecordSets, Data Control, Data Control's Properties, Data Control's Methods – Understanding Relational Concepts – Using Visual Data Manager – Structure of the BIBLIO DataBase – Validating Data – Entering Data – Accessing fields in Recordset – Introduction to SQL – Advanced Data – Bound Controls.
Active Data Objects: Creating Data Project – Designing with DataEnvironment ActiveX Designer – Designing Command Hierarchies, DataEnvironment with Data Grid Control and MSHFlexGrid Control, Data Report ActiveX Designer – ADO Data Control – Programming the Active Data Objects, ADO Object Model, Using ADO, Establishing a Connection, Executing SQL Statements, Manipulating the Recordset Object, Record Editing and Updating.

Text Book

1. Evangelos Petroutsos, Mastering Visual Basic 6, BPB Publications, New Delhi.

Reference

1. PK.MCBride, Programming in Visual Basic, BPB Publications, New Delhi.
2. Steve Brown, Visual Basic 6 in Record Time, BPB Publications.
3. Gary Cornell & Troy Strain, Visual Basic Nuts & Bolts For Experienced Programmers, MCGrawHill Publication, New Delhi.

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III YEAR – V SEMESTER
COURSE CODE: 4BCE5P1

CORE COURSE XI – VISUAL BASIC AND ORACLE LAB

Group –A

1. Write a VB application program for simple Calculator.
2. Write a Visual Basic application Program to find the factorial of the given number using the following
    i) Function
    ii) Subroutine
3. Write a Visual Basic application program for Electricity Bill Processing System
4. Write a Visual Basic application program for Quiz Examination System
5. Write a Program which asks Login, Password from user three times. If the password is right it wishes the user else it gives proper message to the user.
6. To develop a visual basic application for displaying the contents of the selected file using the file list box , directory list box and drive list box.
7. Write a visual basic application program to draw Line, Shape and fill the shape with different style.
8. Write a program for demonstration of graphical image with animation effects.
9. Write a Visual Basic application program to perform the following operation in list box or combo box
    i) Inserting 10 elements during Form Load
    ii) Insert the element ,Remove the element,Search the Element during runtime
10. Write a PL/SQL program to the following
    i) Display the number from 1 to 100
    ii) Display the number from 100 to 1
    iii) Exit the loop when the number is 25.
11. Write a PL/SQL program to set the field of mark1 to 88 when the roll number is 8005 and display the modified result.
12. Write a PL/SQL program to display the employee information whose designation is programmer.
13. Write a PL/SQL program to display the details of employee name, employee number and number of rows using Cursors.
14. Write a PL/SQL block that will raise an exception named zero_mark which will be raised when the mark1 is zero and the roll number is 8005.

Group – B

1. Write a Visual Basic Application program to design a Text Editor that must contains basic File operation and Editing Operation. (Use Microsoft Common Dialog control and Rich Text Box Control)
2. Write a Visual Basic application program to manipulate Student information system with DATA Control (Use MS-Access as Back End)
3. Write a Visual Basic application program to mark sheet processing system using DAO (Use MS-Access as Back End)
4. Write a Visual Basic application program for Mark sheet Processing with ADO Control(Use Oracle as a Back End)

5. Create and Design a data report for Employee Pay slip
6. Create a procedure to
    i) increase the 10% of salary to all employee
    ii) increase the 20% of salary whose department code is 101.
7. Create a function to return the number of employee in the particular department
8. Create and calling a package that contain the two procedure and one function specified in program number 6 and 7
9. Create a trigger before insert or updating a field of salary. If the salary is greater than 10000 then execute the trigger.

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III YEAR – V SEMESTER
COURSE CODE: 4BCEE1A

ELECTIVE COURSE I (A) – DATA MINING AND DATA WAREHOUSING

Unit I

INTRODUCTION: What is a data Warehouse? **DELIVERY PROCESS:** Data warehouse delivery method **SYSTEM PROCESSES:** Introduction – Overview – Typical process flow within a data warehouse – Extract and load process – Clean and transform data – Backup and archive process – Query management process. **PROCESS ARCHITECTURE:** Introduction – Load manager – Warehouse manager – Query manager

Unit II

SYSTEM AND DATA WARE HOUSE PROCESS MANAGERS Introduction – Why you need tools to manage a data warehouse – system managers – Data warehouse process managers – Load manager – Warehouse manager – Query manager **CAPACITY PLANNING, TUNING AND TESTING** Introduction – Process – Estimating the load **TUNING THE DATA WAREHOUSE** Introduction – Assessing performance – Tuning the data load – Tuning queries

Unit III

INTRODUCTION Introduction – Basics of Data Mining – Data Mining Versus Knowledge Discovery in Database – Data Mining Issues – Data Mining Metrics – Social Implications of Data Mining – Data Mining from a Database Perspective

Unit IV

RELATED CONCEPTS Databse/OLTP Systems – Fuzzy Sets and Fuzzy Logic – Information Retrieval – Decision Support Systems – Dimensional Modeling – OLAP – Web Search Engines **DATA MINING TECHNIQUES** Introduction – A Statistical Perpective on Data Mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms

Unit V

ASSOCIATION RULES Introduction – Large Itemsets – Basic Algorithms – Parallel and Distributed Algorithms –Comparing Approaches – Incremental Rules – Advanced Association Rule Techniques – Measuring the Quality of Rule Techniques – Measuring the Quality of Rules

Text Books

1. Data Warehouseing In The Real World ,Sam Anahory, Dennis Murray, Pearson Education [LPE] ,Thirteenth Indian Reprint, 2005.
2. Data Mining Introductory And Advanced Topics, Margaret H.Dunham, Pearson Education [LPE] First Impression, 2006.

Reference Book

1. Insight Into Data Mining Theory And Practice By K.P.Soman Shyam Diwakar V.Vijay PHI Publication
2. Data Warehousing, Data Mining And Olap By Alex Berson And Stephen J.Smith TMH Publication

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III YEAR – V SEMESTER
COURSE CODE: 4BCEE1B

ELECTIVE COURSE I (B) – MULTI MEDIA TECHNOLOGY

Unit- I

Definition - Classification - MM application - MM H/w - MM s/w - CDROM - DVD.

Unit-II

MM Audio: Digital medium - Digital audio technology - sound cards - recording - editing - MP3 - MIDI fundamentals - Working with MIDI - audio file formats - adding sound to MM project.

Unit-III

MM TEXT: Text in MM - MM graphics: coloring - digital imaging fundamentals - development and editing - file formats - scanning and digital photography

Unit-IV

MM Animation : Computer animation fundamentals - Kinematics - morphing - animation s/w tools and techniques. MM Video : How video works - broadcast video standards - digital video fundamentals – digital video production and editing techniques - file formats.

Unit-V

MM Project : stages of project - MM skills - design concept - authoring - planning and costing – MM team

Text Books:

1. Multimedia Magic - S.Gokul revised and updated second edition - BPB
2. Multimedia Making it Work - Tay Vaughen 6th edition – TMH

Reference Books

1. Kiran Thauras, Prabhut K. Andleigu – Multimedia System Design - Prentice Hall India.
2. Malay k pakhira ,Computer graphics,Multimedia and Animation - Prentice Hall India.

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III YEAR – V SEMESTER
COURSE CODE: 4BCEE2A

ELECTIVE COURSE II (A) – DATABASE MANGEMENT SYSTEM

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 – Database Users and Administrators– Transaction Management – Database users and Architectures – History of Database System.
Entity-Relationship Model: E-R model – constraints – E-R diagrams – E-R design issues – weak entity sets – Extended E-R features.

Unit II

Relational Database Design: Features of good Relational designs – Atomic domains and First Normal Form – Decomposition using functional dependencies – Functional dependency theory – Decomposition using functional – Decomposition using multivalued dependencies – more Normal forms – database design process – modeling temporal data

Unit III

Database System Architecture: Centralized and Client-Server architecture – Server system architecture – parallel systems – Distributed systems – Network types. Parallel databases: I/O parallelism – Interquery Parallelism – Intraquery parallelism. Distributed Databases: Homogeneous and Heterogeneous databases – Distributed Data storage – Distributed transactions – Distributed query processing.

Unit IV

Schema Objects Data Integrity – Creating and Maintaining Tables – Indexes – Sequences – Views – Users Privileges and Roles –Synonyms.

Unit V

PL/SQL: PL/SQL – Triggers – Stored Procedures and Functions – Package – Cursors – Transaction

Text Books

1. Database System Concepts – Silberschatz Korth Sudarshan, International (5^{th} Edition) McGraw Hill Higher Education 2006
2. Jose A.Ramalho – Learn ORACLE 8i BPB Publications 2003

Reference Books

1. "Oracle 9i The complete reference", Kevin Loney and George Koch, Tata McGraw Hill, 2004.
2. "Database Management Systems", Ramakrishnan and Gehrke, Mc Graw Hill, Third Edition, 2003.
3. "Oracle 9i PL/SQL Programming "Scott Urman, Oracle Press, Tata Mc Graw Hill, 2002.

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III YEAR – V SEMESTER
COURSE CODE: 4BCEE2B

ELECTIVE COURSE II (B) – ADVANCED JAVA PROGRAMMING

Unit I

Input/Output:
The Java I/O classes and Interfaces – File – The Stream Classes – The Byte Streams – The Character Streams – Using Stream I/O – RMI.

Unit II

Event Handling: The Delegation Event Model – Event Classes – Sources of Events – Event Listener Interfaces– Using the Delegation Event Model – Adapter classes – Inner classes. **Swing:** JApplet – Icons and Labels – Text fields – Buttons – Combo boxes – Tabbed panes – Scroll panes – Trees – Tables.

Unit III

AWT Controls, Layout Managers, and Menus: Control Fundamentals – Labels – Using Buttons – Applying Check Boxes – CheckboxGroup– Choice controls – Using Lists – Managing Scroll Bars – Using a TextField – Using a TextArea – Layout Managers – Menu Bars and Menus – Dialog Boxes – FileDialog.

Unit IV

Networking: Networking Basics – Java and the Net – InetAddress – TCP/IP client Sockets – URL – URL Connection – TCP/IP Server sockets – Datagrams.

Unit V

Java Beans: Advantages – BDK – JAR Files – Introspection – Developing a simple Bean Using the BDK– Using Bound Propertie3s – Using the Bean Info Interface – persistence – Customizes – Java Beans API – Using Bean Builder. **Servlets:** The Life Cycle of a Servlet – Simple Servlet – The Servlet API – The javax.servlet package – Reading Servlet Parameters – The javax.Servlet.http package – Handling HTTP Requests and Responses – Using cookies – Session Tracking.

Text Books

1. "**Java 2 – The complete Reference**", Fifth Edition 2006, **Herbert Schildt**, Tata McGraw – Hill Publishing Company Limited, New Delhi.

Reference Book

1. **"Java-How to Program**" Sixth Edition 2005**, H.M. Deitel, P.J. Deitel**, Pearson Education Pte. Ltd, Delhi.

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III YEAR – VI SEMESTER
COURSE CODE: 4BCE6C1

CORE COURSE XII – COMPUTER NETWORKS

Unit I

Introduction: Uses of Computer Networks – Network Hardware and network software – Reference models – Example Networks

Unit II

The Physical Layer: Guided Transmission Media – Wireless Transmission-Communication Satellites – Public Switched Telephone Network – The Mobile Telephone System

Unit III

Data Link Layer: Design Issues – Error Detection and Correction – Elementary Data link Protocols – Sliding Window Protocol - Medium Access Control Layer: Channel Allocation Problem – Multiple Access Protocol – Ethernet.

Unit IV

Network Layer: Design Issues – Routing Algorithms. Transport Layer: Transport Services – Elements of Transport Protocol.

Unit V

Application Layer: DNS– Electronic Mail – World Wide Web Architectural overview.
Network Security: Cryptography – Symmetric Key Algorithms – Public Key Algorithms

Text Books

1. Andrew S.Tanenbaum, Computer Networks, Fourth Edition, PEARSON Edition

Reference Book

2. Uyless D.Black, Computer Networks, PHIE.
3. Data and Computer Communications, PHI, W.Stallings
4. Data Communication and Networking by Behrouz A.Forouzen, Tata McGraw Hill edition

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III YEAR – VI SEMESTER
COURSE CODE: 4BCE6C2

CORE COURSE XIII – COMPUTER GRAPHICS

Unit I

Geometry and Line Generation: Introduction – Line – Line Segments – Perpendicular Line – Distance between a point and a Line – Vector – Pixels and Frame Buffers – Vector Generation – Bresenham's Algorithm – Antialiasing of Lines – Thick lines Segments – Character Generation – Display the Frame Buffer – Programming Problems.

Unit II

Graphics Primitivies: Introduction – Display Devices – The Display-File Interpreter – Display-File Structure – Display Control – Text – The Line-Style Primitive – Programming Problems.

Polygons: Introduction – Polygons – Polygon Representation – Entering Polygons – An Inside test – Polygon Interfacing Algorithms – Filling Polygons – Filling with Pattern – Initialization – Programming Problems.

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Unit III

Transformations: Introduction – Matrices – Scaling Transformations – Sin and Cos – Rotation– Homogeneous Coordinates and Translation – Coordinate Transformations – Rotation about an Arbitary Point – Other Transformations – Inverse Transformations – Display Procedures – Programming Problems.

Segments: Introducton – Segment Table – Creation – Closing – Deleting – Renaming Segment – Visibility – Saving and Showing – Other Display-File Structure – Some Raster Techniques – Programming Problems.

Unit IV

Windowing and Clipping: Introduction – The Viewing Transformation – Implementation – Clipping – The Cohen-Sutherland – Sutherland-Hodgman Algorithm – Clipping Polygons – Adding Clipping Generalized Clipping – Arbitrary Line – Multiple Windowing Programming Problems.

Unit V

Interaction: Introduction – Hardware – Input Device – Event Handling – Sampled Devices – Attribute – Simulating a Locator – Echoing – Interactive Techniques – Programming Problems.

Text Books

1. Computer Graphics (A Programming Approach) Second Edition by Steven Harrington. McGRAW-HILL INTERNATION EDITIONS

Reference Book

1. M. Newman and F.Sproull, Interactive Computer Graphics, McGraw Hill. Plastok and Gordon Kalley, Computer Graphics, McGraw Hill.

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III YEAR – VI SEMESTER
COURSE CODE: 4BCE6C3

CORE COURSE XIV – SOFTWARE ENGINEERING

Unit I

Introduction: Introduction to software engineering – some definitions – some size factors – quality and productivity factors – managerial issues Planning a software project: Defining the problem – developing a solution strategy – planning the development process – planning an organizational structure – other planning activities

Unit II

Software Cost Estimation: software cost factors – software cost estimation techniques – estimating software maintenance costs
Software Requirements Definition: The software requirements specification – formal specification techniques

Unit III

Software Design: Fundamental design concepts – modules and modularization criteria – design notations – design techniques – Stepwise refinement – Integrated top down development – Jackson Structured Programming -detailed design considerations –test plan – milestones, walkthroughs and inspections – design guidelines

Unit IV

Software Implementation: Structured coding techniques – coding style – standards and guidelines - Verification and validation techniques – Quality Assurance – Walkthrough and inspection - Unit Testing and Debugging – System Testing

Unit V

Software Maintenance: Enhancing maintainability during development – managerial aspects of software engineering – configuration management – source code metrics – other maintenance tools and techniques

Text Book

1. Software Engineering Concepts – Richard E. Fairley, Tata McGraw Hill Publishing Company Ltd, New Delhi

Reference Books

1. Software Engineering – A Practitioner's approach – Roger S. Pressman, (Fourth Edition) McGrawHill International Editions
2. An Integrated Approach to Software engineering – Pankaj Jalote, Second Edition Narosa Publishing House
3. Fundamentals of Software Engineering, Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, Prentice Hall of India Pvt. Ltd., New Delhi

III YEAR – VI SEMESTER
COURSE CODE: 4BCE6P1

CORE COURSE XV – C # . NET LAB

1. Create a simple application using controls. (Any one of Calculator or Drawing Pictures using GDI)
2. Preparation of Electricity bill.
3. Develop an application for Inventory.
4. Develop an application for Employee Payroll System.
5. Develop an application for Student Information System.
6. Develop an application for Library Management.
7. Develop an application for Gas Booking System
8. Develop an application for Income tax processing system
9. Develop an application for Telephone directory maintenance system
10. Develop an application for Student Attendance Maintenance System

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III YEAR – VI SEMESTER
COURSE CODE: 4BCEE3A

ELECTIVE COURSE III (A) – MOBILE COMMUNICATION

Unit I

Introduction – Wireless Transmission – Frequencies for Radio Transmission – Signals – Antennas – Signal propagation – Multiplexing Modulation – Spread Spectrum – Cellular systems

Unit II

Medium Access Control – Motivation for a specialized MAC – SDMA – FDMA – DDMA – CDNMA – Comparison of S/T/F/CDMA.
Telecommunication Systems – GSM – DECT – TETRA – UMTS – and IMT-2000, Satellite systems – GEO 139, LEO 139, MEO 140 – Routing – Localisation – Handover – Broadcast systems – overview, Cyclic Repetition of Data – Digital Audio Broadcasting – Digital Video Broadcasting.

Unit III

Wireless LAN – Infrared Vs Radio Transmission – Infrastructure and AD HOC Networks – IEEE 802.11 – HIPERLAN – Bluetooth.
Wireless ATM – Motivation for WATM – Wireless ATM working Group – WATM services– Reference model – Functions – Radio Access layer – Handover – Location management – Addressing – Mobile quality of service – Access pointer control Protocol.

Unit IV

Mobile network layer – Mobile IP – Dynamic host configuration protocol – AD HOC networks
Mobile Transport Layer – Traditional TCP 292 – Indirect TCP – Snooping TCP, Mobile TCP– Fast Retransmit / Fast Recovery – Transmission / Timeout Freezing, Selective Retransmission – Transaction Oriented TCP.

Unit V

Support for Mobility – File systems Consistency – World wide Web – Hyper text transfer protocol – Hyper text Markup Language – Approaches that might help wireless access – System Architecture – Wireless Application Protocol.

Text Book

1. JOHN SCHILEER, Mobile Communications, Addison Wesley, 2000.

Reference Book

1. Programming WAP, WAP Servelets with WML, WML Script and 3G, by V. K. Jain, Dreamtech Press, 2001

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III YEAR – VI SEMESTER
COURSE CODE: 4BCEE3B

ELECTIVE COURSE III (B) – C# .NET PROGRAMMING

Unit-I

Introduction to C#- Understanding.NET: C# environment – Overview of C#.

Unit-II

C# data types-Simple- Structure - Enumeration-Boxing and unboxing-Constructors-Destructors-Indexes-Events-Applying modifiers.

Unit-III

Control Statement-Iteration-Selection-Examples. Exception Handling-Statements-Throwing Exceptions-Do's and Don'ts – Writing Components in C#- Building-Compiling-Creating Simple Client- Working with Namespaces.

Unit-IV

Configuring and Deployment-Documentation and comments in XML-Conditional Compilation- Documentation Comment – Versioning- Interoperating with un managed code-Platform invocation services- Unsafe code. Debugging- Setting Breakpoints- Attaching to Process- Components- Intermediate Language Disassembler- Security.

Unit- V

Delegates and Events- Managing Console I/O Operations- Managing Errors and Exceptions- Multithreading in C# - Window Forms and Web-based Application Development on .NET.

Text Book:

1. Programming in C# - 3rd Edition – E. Balagurusamy, Tata McGraw Hill Pvt. Ltd

Reference Books:

1. Christopher Wille Presenting C#.WWW.informit.com, 2000.
2. Burton Harvey – C# Programming with Public Beta Wrox,2001.

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ALAGAPPA UNIVERSITY, KARAIKUDI
NEW SYLLABUS UNDER CBCS PATTERN (w.e.f.2017-18)

B.Sc. COMPUTER SCIENCE – PROGRAMME STRUCTURE

Sem	Part	Course Code	Title of the Course	Cr.	Hrs./ Week	Max. Marks		
						Int.	Ext.	Total
I	I	711T	**Tamil/other languages – I**	3	6	25	75	100
	II	712E	**English – I**	3	6	25	75	100
	III	7BCE1C1	**Core–I**– Programming in C	4	6	25	75	100
		7BCE1P1	**Core–II**–Programming in C Lab	4	6	**40**	**60**	100
			Allied – I (Theory only) **(or)** **Allied – I** (Theory cum Practical)	5 4	5 3	25 15	75 60	100 75
			Allied Practical – I	-	2**	--	--	---
	IV	7NME1A/ 7NME1B/ 7NME1C	**(1) Non-Major Elective–I** – **(A)**jkpo;nkhopapd; mbg;gilfs;;;/ **(B)** ,f;fhy ,yf;fpak; / **(C)** Communicative English	2	1	25	75	100
			Total (Allied Theory only)	**21**	**30**	--	--	**600**
			Total (Allied Theory cum Practical)	**20**				**575**
II	I	721T	**Tamil/other languages – II**	3	6	25	75	100
	II	722E	**English – II**	3	6	25	75	100
	III	7BCE2C1	**Core – III** – Object Oriented Programming with C++	4	6	25	75	100
		7BCE2P1	**Core – IV** – Object Oriented Programming with C++ Lab	4	5	**40**	**60**	100
			Allied – II (Theory only) **(or) Allied–II** (Theory cum Practical)	5 4	5 3	25 15	75 60	100 75
			Allied Practical – I	2	2	20	30	50
	IV	7BES2	**(3) Environmental Studies**	2	2	25	75	100
			Total (Allied Theory only)	**21**	**30**	--	--	**600**
			Total (Allied Theory cum Practical)	**22**				**625**
III	I	73IT	**Tamil/other languages – III**	3	6	25	75	100
	II	732E	**English – III**	3	6	25	75	100
	III	7BCE3C1	**Core – V** – Data Structures and Computer Algorithms	4	5	25	75	100
		7BCE3P1	**Core–VI**–Data Structures and Computer Algorithms Lab (using C and C++)	4	5	**40**	**60**	100
	IV		**Allied – I** (Theory only) **(or)** **Allied – I** (Theory cum Practical)	5 4	5 3	25 15	75 60	100 75
			Allied Practical – I	-	2**	--	--	---
	IV	7NME3A/ 7NME3B/ 7NME3C	**(1) Non-major Elective– II** – **(A)** ,yf;fpaKk; nkhopg;gad;ghLk;/ **(B)**goe;jkpo; ,yf;fpaq;fSk; ,yf;fpatuyhWk;/ **(C)** Effective Employability Skills	2	1	25	75	100
		7SBS3A1/ 7SBS3A2/ 7SBS3A3	**(2) Skill Based Subjects – I**	2	2	25	75	100
	V	7BEA3	**Extension activities**	1	-	100	--	100

			Total (Allied Theory only)	**24**	**30**	**--**	**--**	**800**
			Total (Allied Theory cum Practical)	**23**				**775**
IV	I	741T	**Tamil/other languages – IV**	3	6	25	75	100
	II	742E	**English – IV**	3	6	25	75	100
	III	7BCE4C1	**Core – VII** – Java Programming	4	4	25	75	100
		7BCE4P1	**Core–VIII–**Java Programming Lab	4	5	**40**	**60**	100
			Allied – II (Theory only) **(or) Allied–II** (Theory cum Practical)	5 4	5 3	25 15	75 60	100 75
			Allied Practical – I	2	2	20	30	50
	IV	7SBS4B1/ 7SBS4B2/ 7SBS4B3	**(2) Skill Based Subjects – II**	2	2	25	75	100
	IV	7BVE4/ 7BMY4/ 7BWS4	**(4) Value Education / Manavalakalai Yoga / Women's Studies**	2	2	25	75	100
			Total (Allied Theory only)	**23**	**30**	**--**	**--**	**700**
			Total (Allied Theory cum Practical)	**24**				**725**
V	III	7BCE5C1	**Core – IX** – Operating System	4	5	25	75	100
		7BCE5C2	**Core – X** – Relational Database Management Systems	4	5	25	75	100
		7BCE5P1	**Core – XI** – Relational Database Management Systems Lab	4	6	**40**	**60**	100
		7BCEE1A / 7BCEE1B	**Elective–I-A)** Data Mining and Data Warehousing **(or) B)**WEB Design	5	5	25	75	100
		7BCEE2A / 7BCEE2B	**Elective–II**– **A)** Digital Principles and Computer Organization **(or) B)** Microprocessor and Microcontroller	5	5	25	75	100
	IV	7SBS5A4/ 7SBS5A5/ 7SBS5A6/ 7SBS5A7	**(2) Skill Based Subjects – I**	2	2	25	75	100
			(2) Skill Based Subjects – I	2	2	25	75	100
			Total	**26**	**30**	**--**	**--**	**700**
VI	III	7BCE6C1	**Core – XII –**Computer Networks	4	5	25	75	100
		7BCE6C2	**Core – XIII** – Computer Graphics	4	5	25	75	100
		7BCE6C3	**Core – XIV** – Software Engineering	4	5	25	75	100
		7BCE6PR	**Core–XV–Project Work & Viva-Voce**	4	6	**40**	**60**	100
		7BCEE3A/ 7BCEE3B	**Elective – III – A)** VB.NET and ASP.NET programming **(or) B)** Programming with Linux, Apache, MySQL, and PHP (LAMP)	5	5	25	75	100
	IV	7SBS6B4/ 7SBS6B5/ 7SBS6B6/ 7SBS6B7	**(2) Skill Based Subjects – II**	2	2	25	75	100
			(2) Skill Based Subjects – II	2	2	25	75	100
			Total	**25**	**30**	**--**	**--**	**700**
			Grand Total	**140**	**180**	**--**	**--**	**4100**

**** University Examinations will be held in the Even Semesters only.**

Practical Subjects:
The following list of parameters taken into account for the evaluation of practical examination. *Total Marks: 100 (Internal: 40 marks, External: 60 Marks)*

Parameters:
For Internal Marks:

i. Internal test: 20
ii. Record Work: 20

Total: 40

For External Marks:

i.	Aim, Procedure / Algorithm and Program:	15
ii.	Coding and Compilation:	15
iii.	Debugging:	15
iv.	Results:	15
	Total:	**60**

For Project Work:

1. The students will be allowed to work on any project based on the concepts studied in core/elective courses.

2. The project work should be compulsorily done in the college only under the supervision of the department staffs.

3. The combined project shall be undertaken by the students as a team of two.

4. The number of teams should be equally assigned to existing Staff members.

5. The following list of parameters taken into account for the evaluation of Project work and Viva-voce.
   Total Marks: 100 (Internal: 40 marks, External: 60 Marks)

Parameters:

For Internal Marks: Two review meetings: 2 × 15 = 30 Marks
Overall Performance: = 10 Marks

For External Marks: Project Report: 20 Marks
Project demo &Presentation: 20 Marks
Viva-Voce: 20 Marks

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B.Sc., COMPUTER SCIENCE

I YEAR – I SEMESTER
COURSE CODE: 7BCE1C1

CORE COURSE-I–PROGRAMMING IN C

Unit I

Overview of C: History of C – Importance of C – Basic Structure of C Programs – Programming Style – Character Set – C Tokens – Keywords and Identifiers – Constants, Variables and Data Types – Declaration of Variables – Defining Symbolic Constants – Declaring a variable as a constant – overflow and underflow of data – **Operators andExpressions:** Arithmetic, relational, logical, assignment operators – increment and decrement operators, conditional operators, bitwise operators, special operators – Arithmetic Expressions- Evaluation of Expressions – Precedence of Arithmetic Operators – Type Conversions in Expressions – Operator Precedence and Associativity – Mathematical functions.

Unit II

Managing I/O Operations: Reading and Writing a Character – Formatted Input, Output – **Decision Making & Branching:** if statement - if else statement - nesting of if else statements - else if ladder – switch statement – the ?: operator – goto statement – the while statement – do statement – the for statement – jumps in loops.

Unit III

Arrays: One-Dimensional Arrays – Declaration, Initialization – Two-Dimensional Arrays – Multi-dimensional Arrays – Dynamic Arrays – Initialization. **Strings:** Declaration, Initialization of string variables – reading and writing strings – string handling functions.

Unit IV

User-defined functions: need – multi-function programs – elements of user defined functions – definition – return values and their types – function calls, declaration, category – all types of arguments and return values – nesting of functions – recursion – passing arrays, strings to functions – scope visibility and life time of variables. **Structures and Unions:** Defining a structure – declaring a structure variable – accessing structure members – initialization – copying and comparing – operation on individual members – array of structures – arrays within structures – structures within structures – structures and functions – unions – size of structures – bit fields.

Unit V

Pointers: the address of a variable – declaring, initialization of pointer variables – accessing a variable through its pointer – chain of pointers – pointer increments and scale factors – pointers and character strings – pointers as function arguments – pointers and structures. **Files**: Defining, opening, closing a file – IO Operations on files – Error handling during IO operations – command line arguments.

Text Book:

1. Programming in ANSI C, E.Balagurusamy, 6th Edition, Tata McGraw Hill Publishing Company, 2012.
   UNIT I: Chapters 1 (Except 1.3-1.7, 1.10-1.12), 2 (Except 2.9, 2.13), 3 (Except 3.13)
   UNIT II: Chapters 4 – 6
   UNIT III: Chapters 7, 8 (Except 8.5, 8.6, 8.7, 8.9, 8.10)
   UNIT IV: Chapters 9 (Except 9.20), 10
   UNIT V: Chapters 11 (Except 11.8, 11.10, 11.12, 11.14, 11.15, 11.17), 12 (Except 12.6)

Books for Reference:

1. Programming with C, Schaum's Outline Series, Gottfried, Tata McGraw Hill, 2006
2. Programming with ANSI and Turbo C , Ashok N.Kamthane , Pearson Education, 2006
3. H. Schildt, C: The Complete Reference, 4th Edition, TMH Edition, 2000.
4. Kanetkar Y., Let us C, BPB Pub., New Delhi, 1999.

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I YEAR – I SEMESTER
COURSE CODE: 7BCE1P1

CORE COURSE-II–PROGRAMMING IN C LAB

Group – A

1. Write a C Program to find the sum of digits.
2. Write a C Program to check whether a given number is Armstrong or not.
3. Write a C Program to check whether a given number is Prime or not.
4. Write a C Program to generate the Fibonacci series.
5. Write a C Program to display the given number is Adam number or not.
6. Write a C Program to print reverse of the given number and string.
7. Write a C Program to find minimum and maximum of 'n' numbers using array.
8. Write a C Program to arrange the given number in ascending order.
9. Write a C Program to add and multiply two matrices.
10. Write a C Program to calculate NCR and NPR.

Group- B

1. Write a C Program to find the grade of a student using else if ladder.
2. Write a C Program to implement the various string handling function.
3. Write a C Program to create an integer file and displaying the even numbers only.
4. Write a C Program to calculate quadratic equation using switch-case.
5. Write a C Program to count number of characters, words and lines in a text file.
6. Write a C Program to generate student mark list using array of structures.
7. Write a C Program to create and process the student mark list using file
8. Write a C Program to create and process pay bill using file
9. Write a C Program to create and process inventory control using file
10. Write a C Program to create and process electricity bill using file

Note:

One Question from Group A and another one Question from Group B is compulsory for University Examination.

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I YEAR – II SEMESTER
COURSE CODE: 7BCE2C1

CORE COURSE-III–OBJECT ORIENTED PROGRAMMING WITH C++

Unit I

Software Crisis – Software Evolution – Basic Concepts of Object-Oriented Programming – Benefits of OOP – Object-Oriented Languages - Applications of OOP – Application of C++ - Structure of a C++ Program – Tokens – Keywords – Identifiers – Basic Data Types – Userdefined Data types – Derived data types – Symbolic constants – Type compatibility – Declaration of variables – Dynamic initialization of variables –Reference variables – Operators in C++ - Manipulators – Type cast operator – Expressions and their types-Implicit conversions – Control structures – The main function – Function prototyping – inline functions – Function overloading.

Unit II

Specifying a class – Defining member functions – Making an outside function inline – Nesting of member functions – Private member functions – Array within a class – Memory allocation for objects – Static data members – Static member functions – Array of objects - Objects as function arguments – Friendly functions – Returning objects – Constant member functions – Constructors – Parameterized constructor – Multiple constructors in a class – Constructors with default arguments – Dynamic initialization of objects – Copy constructor – Destructors.

Unit III

Defining operator overloading – Overloading unary operators – Overloading binary operators – Overloading binary operators using friend function – Rules for overloading operators - Defining derived classes – Single inheritance – Making a private member inheritable – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance - Virtual base classes – Constructors in derived class – Member classes: Nestingof classes.

Unit IV

Pointer to objects – this pointer – Pointers to derived classes – Virtual functions – Pure virtual functions – C++ Stream classes – Unformatted I/O operations – Managing output with manipulators.

Unit V

Classes of file stream operations – Opening and Closing files – Detecting end of file – More about open() function – File modes, File pointers and their manipulation – Sequential input and output operations – Command-line arguments- Templates: class templates and function templates.

Text Book:

1. Object Oriented Programming with C++**,** E. Balagurusamy, Sixth Edition-2013, McGraw Hill Education (India) Private Limited, New Delhi.
   UNIT I – Chapter 1 (Except 1.3, 1.4),
   Chapter 2 (Only 2.6),
   Chapter 3 (Except 3.20, 3.21, 3.22), Chapter 4

UNIT II – Chapter 5 (Except 5.18, 5.19), Chapter 6 (Except 6.8, 6.9, 6.10)
UNIT III – Chapter 7, Chapter 8
UNIT IV – Chapter 9, Chapter 10
UNIT V – Chapter 11 (Except 11.8), Chapter 12 (Only 12.2, 12.3 and 12.4)

Books for Reference:

1. C++ - The Complete Reference, Herbert Schildt, TMH, 1998.
2. C++ How to Program, Paul Deitel, Harvey Deitel, PHI, Ninth edition (2014).
3. Ashok N.Kamthane, Object Oriented Programming with ANSI & Turbo C ++, Pearson Education, 2006.
4. Object-Oriented Programming With C++, PoornachandraSarang, 2nd Edition, PHI Learning Private Limited, New Delhi, 2009.
5. Object-Oriented Programming Using C++, Alok Kumar Jagadev, Amiya Kumar Rath andSatchidanandaDehuri, Prentice-Hall of India Private Limited, New Delhi, 2007.

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I YEAR – II SEMESTER
COURSE CODE: 7BCE2P1

CORE COURSE-IV–OBJECT ORIENTED PROGRAMMING WITH C++ LAB

Group – A

1. Printing Prime numbers between two given numbers.
2. Printing 3 digit numbers as a series of words. (Ex. 543 should be printed out as Five Four Three).
3. Finding area of geometric shapes using function overloading.
4. Inline functions for simple arithmetic operations.
5. Demonstrating the use of Pre-defined Manipulators.
6. Demonstrating the use of friend function.
7. Creating student mark list using array of objects,
8. Demonstrating constructor overloading.
9. Overloading the unary – operator.
10. Demonstrating single inheritance.
11. Demonstrating the use of "this" pointer.
12. Designing our own manipulator.
13. Illustrating function templates.
14. Illustrating class templates.

Group - B

1. Overloading the binary + operator.
2. Demonstrating Multiple inheritance.
3. Demonstrating Multilevel inheritance.
4. Demonstrating Hierarchical inheritance.
5. Demonstrating Virtual functions.
6. Processing mark list using binary file.
7. Count number of objects in a file.
8. Demonstrating the use of Command-line arguments.

Note:

One Question from Group A and another one Question from Group B is compulsory for University Examination.

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II YEAR – III SEMESTER
COURSE CODE: 7BCE3C1

CORE COURSE-V–DATA STRUCTURES AND COMPUTER ALGORITHMS

Unit I

Introduction to data structure: The need for data Structure-Definitions-Data Structures-Arrays: Introduction, range of an array-one dimensional array-two dimensional array-special types of matrices-linked lists: Introduction - benefits and limitations of linked list-Types-singly linked lists-circular linked lists-doubly linked lists.

Unit II

Stack: Introduction- ADT stack - implementation of stack- application of stack - **Queue:** Introduction - implementation of basic operations on array based and linked list based queue -circular Queues.

Unit III

Trees: Introduction–binary Trees-representation of binary trees-Binary tree Traversals -Recursive procedures of traversal methods-Expression Trees-Threaded Trees-Application of Trees.

Unit IV

Algorithms: Introduction: What is an Algorithm? – Algorithm Specification – Performance Analysis – Divide and Conquer: General method – Binary Search – Finding the maximum and minimum – Merge Sort – Quick Sort – Selection –Strassen's Matrix Multiplication.

Unit V

The Greedy Method: General Method – Knapsack problem – Job Sequencing with deadlines – Optimal Storage on tapes – Optimal merge patterns

Minimum cost spanning trees: Prim's Algorithm – Kruskal Algorithm – Dynamic Problem: All pairs of shortest path – single source shortest path-Travelling salesman problem.

Graph: Graph terminology-connecteed graph-graph traversal techniques-

Text Books:

1. Data Structures, A. Chitra, P. T. Rajan, Vijay Nicol Imprints Pvt Ltd, 2006, McGrawHillEducation of India Pvt Ltd.
   UNIT I – Chapter 1, 3 (Except Multi-dimensional Arrays) and 4 (Except Simple Algorithms on linked lists, Circular doubly linked lists, multiple linked lists, applications, polynomial representation, polynomial addition, representation of polynomials)
   UNIT II – Chapters 5, 6 (Except Tower of Hanoi, Dequeue)
   UNIT III – Chapters (Except Priority Queues)
2. Fundamentals of Computer Algorithms, Ellis Horrowitz, SaratajSahni, Galgottia Publications Pvt Ltd, New Delhi
   UNIT IV – Chapter 1 (Except 1.4), Chapter 3 (Except 3.2, 3.9)
   UNIT V – Chapter 4 (Except 4.2, 4.6.3)

Books for Reference:

1. Data Structure and Algorithm Analysis in C – Mark Allen Weiss – Second Edition, Addison Wesley publishing company, 1997.
2. C and C++ Programming concepts and Data Structures, P.S.Subramanyam, BS Publications, 2013.
3. Data Structures and Algorithms, Alfred V.Aho, John E.Hopcraft and Jeffrey D.Ullman, Pearson Education, Fourteenth Impression, 2013.

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II YEAR – III SEMESTER
COURSE CODE: 7BCE3P1

CORE COURSE-VI–DATA STRUCTURES AND COMPUTER ALGORITHMS LAB (Using C and C++)

Group A
(Programs from Data Structures Using C)

1. Implementing Stack as an array.
2. Implementing Stack as a linked list.
3. Convert Infix expression to Postfix expression using stack.
4. Convert Infix expression to Prefix expression using Stack.
5. Implementing Queue as an Array.
6. Implement Queue as a linked list.
7. Binary tree traversals.
8. Implement Binary Search Tree.

Group B
(Programs from Computer Algorithms Using C++)

1. Linear Search
2. Binary Search
3. Bubble Sort
4. Insertion Sort
5. Merge Sort
6. Quick Sort
7. Selection Sort

Books for Reference:

1. C and C++ Programming concepts and Data Structures, P.S.Subramanyam, BS Publications,2013.

Note:

One Question from Group A and another one Question from Group B is compulsory for University Examination.

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II YEAR – IV SEMESTER
COURSE CODE: 7BCE4C1

CORE COURSE-VII–JAVA PROGRAMMING

Unit I

Java Evolution:

Java History – Java Features – Java and Internet – World Wide Web –Web Browsers – H/W and S/W requirements – Java Support Systems – Java Environment.

Overview of Java language:

Introduction – Simple Java Program –Comments – Java Program Structure –Tokens – Java Statements – Implementing a Java Program – JVM – Command Line Arguments. Constants – Variables – Data Types – Type Casting.

Unit II

Operators and Expressions:

Arithmetic Operators – Relational, Logical, Assignment, Increment and Decrement, Conditional, Bitwise, Special Operators – Arithmetic expressions, Evaluation of expression – Precedence of Arithmetic Operators – Type Conversions – Operator Precedence and associativity – Mathematical Functions. **Decision Making and Branching:** If – if…..else – Nesting of if……. Else – else if – switch - ?Operator. **Decision Making and Looping:** While – do – for – jump in loops – labeled loops.

Unit III

Classes, Objects and Methods:

Defining a class – Adding variables, methods – Creating objects – Accessing Class Members– Constructors – Methods overloading – static members – Nesting of Methods – Inheritance – Overriding methods – final Variables and methods – Final classes – finalizer methods – Abstract methods and classes – visibility control. **Arrays, Strings and Vectors:** Arrays – One Dimensional Arrays – Creating an array – Two Dimensional Arrays – Strings – Vectors – Wrapper Classes **Interfaces: Multiple Inheritance** Defining interfaces – Extending interfaces – implementing interfaces – Accessing interface variables.

Unit IV

Packages:

Java API Packages – Using system packages – Naming conventions – Creating Packages – Accessing a Package – Using a Package – Adding a Class to a Package – hiding classes.

Multithreaded Programming:

Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread – Using Thread methods – Thread Exceptions – Thread Priority – Synchronization – Implementing the ‘Runnable’ Interface

Managing Errors and Exceptions:

Types of errors – Exceptions – Syntax of Exception handling code – Multiple Catch Statements – Using finally statement – Throwing our own Exceptions – Using Exceptions for Debugging.

Unit V

Applet Programming:

How applets differ from Applications – preparing to write applets – Building Applet Code – Applet life cycle – creating an Executable Applet – Designing a Web Page – Applet Tag – Adding Applet to HTML file – Running the Applet – Passing parameters to Applets – Displaying Numerical values – Getting input from the user

Graphics Programming:

The Graphics Class – Lines and Rectangles – Circles and Ellipses – Drawing Arcs – Drawing Polygons – Line Graphs – Using Control Loops in Applets – Drawing Bar Charts.

Text Book:

1. Programming with java, E.Balagurusamy TMH, 4th Edition.

Books for Reference:

1. Java 2- The Complete Reference , Herbert Schildt , 5th Edition(2002) , McGraw Hill Education (India) Private Limited.
2. Programming with Java (Schaum's Outline Series) , John R.Hubbard, , 2nd Edition(2004), McGraw-Hill International Editions.
3. Programming in Java2, By Dr.K.Somasundaram , Publisher : First Edition JAICO Publishing House, 2008.

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II YEAR – IV SEMESTER
COURSE CODE: 7BCE4P1

CORE COURSE-VIII–JAVA PROGRAMMING LAB

Group –A

1. Applet Program to Displaying Digital Clock . (Ex: 09:15:45 AM)
2. Applet Program to Draw our National Flag.
3. Applet Program to Draw Bar Charts with different colors.
4. Applet Program to draw Building with attractive colors.
5. Applet Program to addition and multiplication of two numbers
6. Write applets to draw the following Shapes:
7. **(a).** Cone **(b).** Cylinder **(c).** Square inside a Circle **(d).** Circle inside a Square
8. Write an applet Program to design a simple calculator.
9. Write an Applet Program to animate a ball across the Screen.

Group – B

1. To perform addition and subtraction of complex numbers using class and objects.
2. Program to calculate area of Square and Rectangle using Method Overloading.
3. Program to implement User-Defined Exception (minimum 3 types of exception should be used).
4. Create two threads such that one of the thread generate Fibonacci series and another generate perfect numbers between two given limits.
5. Using command line arguments, test if the given string is palindrome or not.
6. Program to perform Matrix Addition and Multiplication using class.
7. Program to perform the String operations. (Reverse, Copy, Concatenate, Compare)
8. Program to display student mark details using Single Inheritance.
9. Using multilevel inheritance process student marks.
10. Implement multiple inheritance for payroll processing.
11. Program to implement banking transaction using Interface.
12. Program to implement Multiple Thread.
13. Program to implement Package .

Note:

One Question from Group A and another one Question from Group B is compulsory for University Examination.

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III YEAR – V SEMESTER
COURSE CODE: 7BCE5C1

CORE COURSE-IX–OPERATING SYSTEM

Unit I

Introduction to Operating Systems: Introduction, What is an Operating systems, Operating system components and goals, Operating systems architecture. Process Concepts: Introduction, Process States, Process Management, Interrupts, Interprocess Communication.

Unit II

Asynchronous Concurrent Execution: Introduction, Mutual Exclusion, Implementing Mutual Exclusion Primitives, Software solutions to the Mutual Exclusion Problem, Hardware solution to the Mutual Exclusion Problem, Semaphores. Concurrent Programming: Introduction,Monitors.

Unit III

Deadlock and Indefinite Postponement: Introduction, Examples of Deadlock, Related Problem Indefinite Postponement, Resource concepts, Four Necessary conditions for Deadlock, Deadlock solution, Deadlock Prevention, Deadlock Avoidance with Dijkstra's Banker's algorithm, Deadlock Detection, Deadlock Recovery.
Processor Scheduling: Introduction, Scheduling levels, Preemptive Vs NonPreemptive Scheduling Priorities, Scheduling objective, Scheduling criteria, Scheduling algorithms.

Unit IV

Real Memory Organization and Management: Introduction, Memory organization, Memory Management, Memory Hierarchy, Memory Management Strategies, Contiguous Vs Non-Contiguous Memory allocation, Fixed Partition Multiprogrammimg, Variable Partition multiprogramming.

Virtual Memory Management: Introduction, Page Replacement, Page Replacement Strategies, Page Fault Frequency (PFF) Page replacement, Page Release, Page Size.

Unit V

Disk Performance Optimization: Introduction, Why Disk Scheduling is necessary, Disk Scheduling strategies, Rotational optimization.

File and Database Systems: Introduction, Data Hierarchy, Files, File Systems, File Organization, File Allocation, Free Space Management, File Access control.

Text Book:

1. Operating Systems, Deitel&DeitelChoffnes, Pearson education, Third edition, 2008.
   UNIT I: Chapter 1: 1.1, 1.2, 1.12, 1.13 &
   Chapter 3: 3.1, 3.2, 3.3, 3.4, 3.5
   UNIT II: Chapter 5: 5.1, 5.2, 5.3, 5.4(up to 5.4.2), 5.5, 5.6 &
   Chapter 6: 6.1, 6.2
   UNIT III: Chapter 7: 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8, 7.9, 7.10
   Chapter 8: 8.1, 8.2, 8 3, 8.4, 8.5, 8.6, 8.7
   UNIT IV: Chapter 9: 9.1, 9 2, 9.3, 9 4, 9.5, 9.6, 9.8, 9.9
   Chapter 11: 11.1, 11.5, 11.6, 11.8, 11.9, 11.10
   UNIT V: Chapter 12: 12.1, 12.4, 12.5, 12.6
   Chapter 13: 13.1, 13 2, 13.3, 13.4, 13.5, 13.6, 13.7, 13.8

Books for Reference:

1. An introduction to Operating systems concepts and Practice, Pramod Chandra P. Bhatt, PHI, Second Edition, 2008.
2. Operating System Concepts, Abraham Silberschatz Peter Galvin Greg Gagne, 6th edition Windows XP Update, Wiley India edition, 2007.
3. Operating Systems Principles and Design, Pal Choudhury, PHI Learning, 2011.
4. Operating Systems, A Concept Based Approach DhananjayM.Dhamdhere Tata Mc Graw Hill, 3rd Edition, 2012

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III YEAR – V SEMESTER
COURSE CODE: 7BCE5C2

CORE COURSE-X–RELATIONAL DATABASE MANGEMENT SYSTEMS

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 – Database Users and Administrators– Transaction Management – Database users and Architectures – History of Database System.

Entity-Relationship Model: E-R model – constraints – E-R diagrams – E-R design issues – weak entity sets – Extended E-R features.

Unit II

Relational Database Design: Features of good Relational designs – Atomic domains and First Normal Form – Decomposition using functional dependencies – Functional dependency theory – Decomposition using functional – Decomposition using multivalued dependencies – more Normal forms – database design process – modeling temporal data

Unit III

Database System Architecture: Centralized and Client-Server architecture – Server system architecture – parallel systems – Distributed systems – Network types. Parallel databases: I/O parallelism – Interquery Parallelism – Intraquery parallelism. Distributed Databases: Homogeneous and Heterogeneous databases – Distributed Data storage – Distributed transactions – Distributed query processing.

Unit IV

Schema Objects Data Integrity – Creating and Maintaining Tables – Indexes – Sequences – Views – Users Privileges and Roles –Synonyms.

Unit V

PL/SQL: PL/SQL – Triggers – Stored Procedures and Functions – Package – Cursors – Transaction

Text Books:

1. Database System Concepts – SilberschatzKorthSudarshan, International (5^{th} Edition) McGraw Hill Higher Education 2006
2. Jose A.Ramalho – Learn ORACLE 8i BPB Publications 2003

Books for Reference:

1. "Oracle 9i The complete reference", Kevin Loney and George Koch, Tata McGraw Hill, 2004.
2. "Database Management Systems", Ramakrishnan and Gehrke, Mc Graw Hill, Third Edition, 2003.
3. "Oracle 9i PL/SQL Programming "Scott Urman, Oracle Press, Tata Mc Graw Hill, 2002.

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III YEAR – V SEMESTER
COURSE CODE: 7BCE5P1

CORE COURSE-XI–RELATIONAL DATABASE MANAGEMENT SYSTEMS LAB

The following concepts must be introduced to the students:

DDL Commands

- Create table, alter table, drop table

DML Commands

- Select, update, delete and insert statements
- Condition specification using Boolean and comparison operators (and, or,not,=,<>,>,<,>=,<=)
- Arithmetic operators and aggregate functions (Count, Sum, Avg, Min, Max)
- Multiple table queries (join on different and same tables)
- Nested select statements
- Set manipulation using (any, in, contains, all, not in, not contains, exists, not exists, union, intersect, minus, etc.)
- Categorization using group by……..having
- Arranging using order by

I. Create a table Student-master with the following fields client_no,name, address, city, state, pincode, remarks, bal_due with suitable data types.
   a. Create another table supplier_table from client_master. Select all the fields and rename client_no with supplier_no and name with supplier_name.
   b. Insert data into client_master
   c. Insert data into supplier_master from client_master.
   d. Delete the selected row in the client_master.

II. Create a table sales_order with s_order_no and product_no as primary key. Set other fields to store client number, delivery address, delivery date,order status.
   a. Add a new column for storing salesman number using ALTER Command.
   b. Set the s_order_no as foregin key as column constraints.
   c. Set the s_order_no as foreign key as table constraints.
   d. Enforce the integrity rules using CHECK.

III. Create a table student_master with the following fields name, regno, dept and year with suitable data types. Use Select command to do the following.
   a. Select the student's name column.
   b. Eliminate the duplicate entry in table.
   c. Sort the table in alphabetical order.
   d. Select all the Students of a particular department.

IV. Create a table sales_order_details with the s_order_no as primary key and with the following fields: product_no, description, qty_ordered, qty_disp,product_rate, profit_percent, sell_price, supplier_name.

a. Select each row and compute sell_price*.50 and sell_price*1.50 for each row selected.
b. Select product_no, profit_percent, Sell_price where profit_per is not between 10 and 20 both inclusive.
c. Select product_no, description, profit_percent, sell_price where profit_percent is not between 20 and 30.
d. Select the suppliername and product_no where suppliername has 'r' or 'h'as second character.

V. Create and use the following database schema to answer the given queries

EMPLOYEE			
DEFAULT			
Field	**Type**	**Null**	**Key**
Eno	Char(3)	No	Primary
Ename	Varchar(50)	No	
Job_type	Varchar(50)	No	
Manager	Char(3)	Yes	Foreign
Hiredate	Date	No	
Dno	Integer	Yes	Foreign
Commission	Decimal(10,2)	Yes	
Salary	Decimal(7,2)	No	

DEPARTMENT			
DEFAULT			
Field	Type	Null	Key
Dno	Integer	No	Primary
Dname	Varchar(50)	Yes	

Perform the following queries:

a. Query to display Employee Name, Job, Hire Date, Employee Number; for each employee with the Employee Number appearing first.
b. Query to display unique Jobs from the Employee Table.
c. Query to display the Employee Name concatenated by a Job separated by a comma.
d. Query to display all the data from the Employee Table. Separate each Column by a comma and name the said column as THE_OUTPUT.
e. Query to display the Employee Name and Salary of all the employees earning more than $2850.
f. Query to display Employee Name and Department Number for the Employee No= 7900.
g. Query to display Employee Name and Salary for all employees whose salary is not in the range of $1500 and $2850.
h. Query to display Employee Name and Department No. of all the employees in Dept. 10 and Dept 30 in the alphabetical order by name.
i. Query to display Name and Hire Date of every Employee who was hired in 1981.
j. Query to display Name and Job of all employees who don't have a current Manager.

k. Query to display the Name, Salary and Commission for all the employees who earn commission.
l. Sort the data in descending order of Salary and Commission.
m. Query to display Name of all the employees where the third letter of their name is _A‘.
n. Query to display Name of all employees either have two _R‘s or have two _A‘s in their name and are either in Dept. No=30 or their Manger‘s Employee No=7788.
o. Query to display Name, Salary and Commission for all employees whose Commission Amount is 14 greater than their Salary increased by 5%.
p. Query to display Name, Hire Date and Salary Review Date which is the 1st Monday after six months of employment.
q. Query to display Name and calculate the number of months between today and the date each employee was hired.
r. Query to display Name with the 1st letter capitalized and all other letter lower case and length of their name of all the employees whose name starts with _J‘, ‘A‘ and _M‘.
s. Query to display Name, Department Name and Department No for all the employees.
t. Query to display Unique Listing of all Jobs that are in Department # 30.
u. Query to display Name, Job, Department No. And Department Name for all the employees working at the Mumbai location.
v. Query to display Name, Dept No. And Salary of any employee whose department No. and salary matches both the department no. and the salary of any employee who earns a commission.
w. Query to display the Highest, Lowest, Sum and Average Salaries of all the employees
x. Query to display the Employee No. And Name for all employees who earn more than the average salary.
y. Query to display Employee Number and Name for all employees who work in a department with any employee whose name contains a _T‘.

VI. Create a table master_book to contain the information of magazine code, magazine name and publisher. Weekly/biweekly/monthly, price. Write PL/SQL block to perform insert, update and delete operations on the above table.

VII. Create a table to contain phone number, user name, address of the phone user. Write a function to search for a address using phone numbers.

VIII. Create a table stock to contain the item-code, item-name, current stock, date of last purchase. Write a stored procedure to seek for an item using item-code and delete it, if the date of last purchase is before 1 year from the current date. If not, update the current stock.

IX. Create a table to store the salary details of the employees in a company. Declare the Cursor to contain employee number, employee name and net salary. Use Cursor to update the employee salaries.

X. Create a table to contain the information about the voters in a particular constituency. Write a proper trigger to update or delete a row in the table.

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III YEAR – V SEMESTER
COURSE CODE: 7BCEE1A

ELECTIVE COURSE-I (A)–DATA MINING AND DATA WAREHOUSING

Unit I

INTRODUCTION: What is a data Warehouse? **DELIVERY PROCESS:** Data warehouse delivery method **SYSTEM PROCESSES:** Introduction – Overview – Typical process flow within a data warehouse – Extract and load process – Clean and transform data – Backup and archive process – Query management process. **PROCESS ARCHITECTURE:** Introduction – Load manager – Warehouse manager – Query manager

Unit II

SYSTEM AND DATA WARE HOUSE PROCESS MANAGERS Introduction – Why you need tools to manage a data warehouse – system managers – Data warehouse process managers – Load manager – Warehouse manager – Query manager **CAPACITY PLANNING, TUNING AND TESTING** Introduction – Process – Estimating the load **TUNING THE DATA WAREHOUSE** Introduction – Assessing performance – Tuning the data load – Tuning queries

Unit III

INTRODUCTION Introduction – Basics of Data Mining – Data Mining Versus Knowledge Discovery in Database – Data Mining Issues – Data Mining Metrics – Social Implications of Data Mining – Data Mining from a Database Perspective

Unit IV

RELATED CONCEPTS Databse/OLTP Systems – Fuzzy Sets and Fuzzy Logic – Information Retrieval – Decision Support Systems – Dimensional Modeling – OLAP – Web Search Engines **DATA MINING TECHNIQUES** Introduction – A Statistical Perpective on Data Mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms

Unit V

ASSOCIATION RULES Introduction – Large Itemsets – Basic Algorithms – Parallel and Distributed Algorithms –Comparing Approaches – Incremental Rules – Advanced Association Rule Techniques – Measuring the Quality of Rule Techniques – Measuring the Quality of Rules

Text Books:

1. Data Warehouseing In The Real World,Sam Anahory, Dennis Murray, Pearson Education [LPE] ,Thirteenth Indian Reprint, 2005.
2. Data Mining Introductory And Advanced Topics, Margaret H.Dunham, Pearson Education [LPE] First Impression, 2006.

Books for Reference:

1. Insight Into Data Mining Theory And Practice By K.P.SomanShyamDiwakarV.Vijay PHI Publication
2. Data Warehousing, Data Mining And Olap By Alex Berson And Stephen J.SmithTMH Publication
3. Data Mining Introductory And Advanced Topics, Margaret H.Dunham, Pearson Education [LPE] First Impression, 2006

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III YEAR – V SEMESTER
COURSE CODE: 7BCEE1B

ELECTIVE COURSE-I (B)–WEB DESIGN

Unit I

Introduction to HTML: Markup Languages – editing HTML – common tags – header – text styling – linking – images – formatting text – special characters, horizontal rules and line breaks – unordered list – nested and ordered list – tables and formatting – forms – linking – frames.

Unit II

Cascading Style Sheets:

Introduction – Inline styles – Embedded Style Sheets – Conflicting Style – Linking External Style Sheets – Positioning Elements – Backgrounds – Element Dimension – Box Model and Text Flow – Media Types – Building a Dropdown menu

Unit III

Java Script: introduction – control structures – if structure – while structure – assignment operators – increment and decrement operators – for structure – switch structure – do/while structure – break and continue statement – logical operators

Unit IV

Java Script Functions: Programmer defined functions – function definitions – duration of identifiers – scope rules – recursion – recursion vs iteration – global functions

Java Script Arrays: Arrays – declaring and allocating arrays – references and reference parameters – passing arrays to functions – sorting arrays – searching arrays – multiple-subscripted arrays

Java Script Objects: Math object – String object – Date object – Boolean and Number Object – document object – window object.

Unit V

Document Object Model (DOM): Modeling a document – Traversing and modifying a DOM Tree – DOM collections and Dynamic styles.

Events: Registering Event Handlers – onload - onmousemove, the event Object and this – on mouseover and on mouseout – onfocus and onblur – form processing with onsubmit and onreset – event bubbling and other events.

XML: Basics – structuring Data – XML Name Spaces – Document Type Definations – W3C XML schema documents – XML Vocabularies – XSLT

Text Book:

1. "Internet and World Wide Web – How to Program", H.M.Deitel, P.J.Deital, T.R.Nieto, Pearson Education Asia – Addison Wesley Longman Pte Ltd.

Book for Reference:

1. "Special edition using HTML", Mark R Brown and Jerry Honeycutt, Third edition

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III YEAR – V SEMESTER
COURSE CODE: 7BCEE2A

ELECTIVE COURSE-II (A)–DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION

Unit I

Number Systems and Codes: Binary Number system – Binary to decimal –decimal to binary – hexa decimal – ASCII code – Excess-3 Code – Gray code.
Digital Logic: The Basic Gates – NOT, OR, AND - Universal Logic Gates – NOR, NAND.

Unit II

Combinatorial Logic Circuits: Boolean Laws and Theorems. - Sum of Products method -Truth table to Karnaugh Map – Pairs, Quads, Octets – Don't Care Conditions- Product-of sums method -Product-of sums Simplifications.

Data Processing Circuits: Multiplexers – Demultiplexers-1-of-16 Decoder – BDC-todecimal Decoders – Seven-segment Decoders – Encoders – Exclusive-OR Gates- Parity Generators and Checkers.

Unit III

Arithmetic Circuits: Binary Addition- Binary Subtraction – 2'S Complement Representation - 2'S Complement Arithmetic – Arithmetic Building Blocks.

Unit IV

Basic Computer organization and Design: Instruction codes - stored program organization - Computer registers and common bus system - Computer instructions - Timing and control - Instruction cycle: Fetch and Decode - Register reference instructions.

Micro programmed Control: Control memory organization - Address sequencing, micro instruction format and symbolic microinstructions - symbolic micro-program - binary microprogram.

Unit V

Central Processing Unit : General register organization - stack organization – instruction formats - addressing modes - Data transfer and manipulation - Program control. CISC and RISC - Parallel processing - Pipeline- general consideration.

Input-output organization: Peripheral devices - I/O interface - Memory organization: Memory hierarchy - Main memory - Auxiliary memory.

Text Book:

1. Digital Principles and Applications – Donald P Leach, Albert Paul Malvino, GoutamSaha, 8th edition , McGraw-Hill Education, 3rd reprint 2015. 2.
2. Computer System Architecture, M. Morris Mano, Pearson Education, 3rd edition.,2007

UNIT I	Chapters 5: (5.1 to 5.9) and 2: (2.1 to 2.3)	Text Book 1
UNIT II	Chapters 3: (3.1 to 3.8) and 4: (4.1 to 4.7)	Text Book 1
UNIT III	Chapters 6: (6.1 to 6.8)	Text Book 1
UNIT IV	Chapters 5 (5.1 to 5.5) and 7 (7.1 to 7.3)	Text Book 2
UNIT V	Chapters 8 (8.1 to 8.8), 9 (9.1 to 9.2), 11 (11.1 to 11.5) and 12(12.1 to 12.3)	Text Book 2

Books for Reference:

1. Digital design, R.Anantha Natarajan, PHI Learning, 2015.
2. Principles of digital Electronics, K.Meena, PHI Learning, 2013.
3. Digital Computer Fundamentals, Thomas C. Bartee TMH 2007.
4. Digital Circuits and Design, S. Salivahanan and S. Arivazhagan, Vikas Publishers, 2005.
5. Computer Organization and Architecture, V.Rajaraman and T.Radhakrishnan, PHI learning, 5th Print, 2015.
6. Computer Organization, Carl HamacherZvonkoVranesicSafwatZaky, McGraw Hill Education, 5th Edition, 11th reprint, 2015.
7. Computer Organization and Architecture, SmrutiRanjan Sarangi, McGraw Hill Education.

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III YEAR – V SEMESTER
COURSE CODE: 7BCEE2B

ELECTIVE COURSE-II (B)–MICROPROCESSOR AND MICROCONTROLLER

Unit I THE 8086 MICROPROCESSOR

Introduction to 8086 – Microprocessor architecture – Addressing modes - Instruction set and assembler directives – Assembly language programming – Modular Programming - Linking and Relocation - Stacks - Procedures – Macros – Interrupts and interrupt service routines – byte and String Manipulation.

Unit II 8086 SYSTEM BUS STRUCTURE

8086 signals – Basic configurations – System bus timing –System design using 8086 – IO programming – Introduction to Multiprogramming – System Bus Structure Multiprocessor configurations – Coprocessor, Closely coupled and loosely Coupled configurations – Introduction to advanced processors.

Unit III I/O INTERFACING

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications Case studies: Traffic Light control, LED display , LCD display, Keyboard display interface and Alarm Controller.

Unit IV MICROCONTROLLER

Architecture of 8051 – Special Function Registers(SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming.

Unit V INTERFACING MICROCONTROLLER

Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation.

Text Books:

1. Yu-Cheng Liu, Glenn A.Gibson,"Microcomputer Systems:The 8086 /8088 Family - Architecture,Programming and Design",Second Edition, Prentice Hall of India, 2007.
2. Mohamed Ali Mazidi, Janice GillispieMazidi, RolinMcKinlay, "The 8051 Microcontroller and Embedded Systems: Using Assembly and C", Second Edition, Pearson Education, 2011

Book for Reference:

1. DoughlasV.Hall, "Microprocessors and Interfacing, Programming and Hardware:,TMH, 2012

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III YEAR – VI SEMESTER
COURSE CODE: 7BCE6C1

CORE COURSE-XII–COMPUTER NETWORKS

Unit I

Uses of Computer Networks:– Network Hardware –Network software – OSI and TCP/IP Reference models – Example Networks :Internet.

Unit II:

The Physical Layer: Guided Transmission Media – Wireless Transmission– Communication Satellites – Public Switched Telephone Network – The Mobile Telephone System

Unit III

Data Link Layer: Design Issues – Error Detection and Correction – Elementary Data link Protocols – Sliding Window Protocol - Medium Access Control Layer: Channel Allocation Problem – Multiple Access Protocol – Ethernet.

Unit IV

Network Layer: Design Issues – Routing Algorithms.

Transport Layer: Transport Services – Elements of Transport Protocols.

Unit V

Application Layer: DNS– Electronic Mail – World Wide Web Architectural overview.

Network Security: Cryptography – Symmetric Key Algorithms – Public Key Algorithms

Text Book:

1. Computer Networks, Andrew S Tanenbaum and D. J. Wetherall, 5th Ed, Pearson, 2011.

Books for Reference:

1. UylessD.Black, Computer Networks, PHIE.
2. Data and Computer Communications, PHI, W.Stallings
3. Data Communications and Computer Networks, Brijendra Singh ,Second Edition, PHI, 2006.
4. Data Communications and Computer Networks , Prakash C. Gupta, Prentice Hall of India, 2005.
5. Data Communications and Networks ,Achyut S Godbole, TMH,2005.
6. Data Communication and Networking ,Behrouz A. Forouzan, TMH, 2005.

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III YEAR – VI SEMESTER
COURSE CODE: 7BCE6C2

CORE COURSE-XIII–COMPUTER GRAPHICS

Unit I

Geometry and Line Generation: Introduction – Line – Line Segments – Perpendicular Line – Distance between a point and a Line – Vector – Pixels and Frame Buffers – Vector Generation – Bresenham's Algorithm – Antialiasing of Lines – Thick lines Segments – Character Generation – Display the Frame Buffer – Programming Problems.

Unit II

Graphics Primitivies: Introduction – Display Devices – The Display-File Interpreter – Display-File Structure – Display Control – Text – The Line-Style Primitive – Programming Problems.

Polygons: Introduction – Polygons – Polygon Representation – Entering Polygons – An Inside test – Polygon Interfacing Algorithms – Filling Polygons – Filling with Pattern – Initialization – Programming Problems.

Unit III

Transformations: Introduction – Matrices – Scaling Transformations – Sin and Cos – Rotation– Homogeneous Coordinates and Translation – Coordinate Transformations – Rotation about an Arbitary Point – Other Transformations – Inverse Transformations – Display Procedures – Programming Problems.

Segments: Introducton – Segment Table – Creation – Closing – Deleting – Renaming Segment – Visibility – Saving and Showing – Other Display-File Structure – Some Raster Techniques – Programming Problems.

Unit IV

Windowing and Clipping: Introduction – The Viewing Transformation – Implementation – Clipping – The Cohen-Sutherland – Sutherland-Hodgman Algorithm – Clipping Polygons – Adding Clipping Generalized Clipping – Arbitrary Line – Multiple Windowing Programming Problems.

Unit V

Interaction: Introduction – Hardware – Input Device – Event Handling – Sampled Devices – Attribute – Simulating a Locator – Echoing – Interactive Techniques – Programming Problems.

Text Book:

1. Computer Graphics (A Programming Approach) Second Edition by Steven Harrington. McGRAW-HILL INTERNATION EDITIONS

Book for Reference:

1. M. Newman and F.Sproull, Interactive Computer Graphics, McGraw Hill. Plastok and Gordon Kalley, Computer Graphics, McGraw Hill.

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III YEAR – VI SEMESTER
COURSE CODE: 7BCE6C3

CORE COURSE-XIV–SOFTWARE ENGINEERING

Unit I

Introduction: Introduction to software engineering – some definitions – some size factors –quality and productivity factors – managerial issuesPlanning a software project: Defining the problem– developing a solution strategy – planning the development process – planning an organizational structure – other planning activities

Unit II

Software Cost Estimation: software cost factors – software cost estimation techniques –estimating software maintenance costs

Software Requirements Definition: The software requirements specification – formal specification techniques

Unit III

Software Design: Fundamental design concepts – modules and modularization criteria – design notations – design techniques – Stepwise refinement – Integrated top down development – Jackson Structured Programming -detailed design considerations –test plan – milestones,walkthroughs and inspections – design guidelines

Unit IV

Software Implementation: Structured coding techniques – coding style – standards and guidelines - Verification and validation techniques – Quality Assurance – Walkthrough and inspection -Unit Testing and Debugging – System Testing

Unit V

Software Maintenance: Enhancing maintainability during development – managerial aspects of software engineering – configuration management – source code metrics – other maintenance tools and techniques

Text Book:

1. Software Engineering Concepts – Richard E. Fairley, Tata McGraw Hill Publishing Company Ltd, New Delhi

Books for Reference:

1. Software Engineering – A Practitioner's approach – Roger S. Pressman, (Fourth Edition) McGrawHill International Editions
2. An Integrated Approach to Software engineering – Pankaj Jalote, Second Edition Narosa Publishing House
3. Fundamentals of Software Engineering, CarloGhezzi, Mehdi Jazayeri, Dino Mandrioli, Prentice Hall of India Pvt. Ltd.,New Delhi

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III YEAR – VI SEMESTER
COURSE CODE: 7BCE6PR

CORE COURSE-XV–PROJECT WORK & VIVA-VOCE

1. The students will be allowed to work on any project based on the concepts studied in core/elective courses.

2. The project work should be compulsorily done in the college only under the supervision of the department staffs.

3. The combined project shall be undertaken by the students as a team of two.

4. The number of teams should be equally assigned to existing Staff members.

5. The following list of parameters taken into account for the evaluation of Project work and Viva-voce.
   Total Marks: 100 (Internal: 40 marks, External: 60 Marks)

Parameters:

For Internal Marks: Two review meetings - 2 × 15 = 30 Marks
Overall Performance = 10 Marks

Total = 40 Marks

For External Marks: Project Report = 20 Marks
Project demo &Presentation = 20 Marks
Viva-Voce = 20 Marks

Total = 60 Marks

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III YEAR – VI SEMESTER
COURSE CODE: 7BCEE3A

ELECTIVE COURSE-III (A)–VB.NET AND ASP.NET PROGRAMMING

Unit I

The .Net framework and the CLR – Building VB .Net Applications–The VB IDE - Declaring constants–enumeration– variables– Data types – Operators – Conditional Statements : If else, Select Case, Switch , choose- Loops: Do, for, for each, next, while– The with statement.Sub Procedures – Functions – Understanding Scope – Unstructured and Structured Exception Handling

Unit II

Windows Forms–MDI– Windows Control: Msgbox – Input box – Textboxes – Rich text box – Labels – Buttons – Check boxes – Radio Button – Panels –List boxes – Combo boxes – Scroll bars – Timers–Checked List Boxes –Picture Boxes– Scroll Bars – Tool Tips– Menus – Built –in Dialog Boxes– Printing– Tree and List Views –Toolbars – Status and Progress Bars and Tab.

Unit III

Object Oriented Programming : Classes and objects – Inheritance – Polymorphism- Graphics class – Pen class – Brush class – File stream class – File mode enumeration – File stream class – File class – Directory class.

Unit IV

ASP .Net Applications – ASP. Net file types – Importing Namespaces – Global.asax application file – HTML Server controls – The Page Class – BASIC WEB CONTROLS: Button – Check box- Hyperlink-image-Label – Radio button – Table – Text box. LIST CONTROLS: DropdownList – List Box. RICH CONTROLS: Add Rotator – Calendar. VALIDATION CONTROLS: Compare validator – Range Validator. DATA CONTROLS: Repeater – Data list. HTML CONTROLS: Htmlanchor – HtmlButton- HtmlForm – HtmlImage.

Unit V

ADO.NET : Introducing Ado.Net and Data management- Characteristics of Ado.Net – The Ado.Net object model – SQL Basics – SQL select statement – SQL update statement – SQL Insert – SQL Delete statement. GRAPHICS

Text Books:

1. Visual Basic.Net Programming Black Book,Steven Holzner ,Dream Tech Press, 2010.
2. The Complete Reference –ASP .NET- Mathew Mac Donald – Mc Graw Hill.

Books for Reference:

1. Visual Basic.Net, C.Muthu , Tata McGrawHill Education , 2008.
2. The Complete Reference Visual Basic.Net, Jeffrey R.Shapiro , Tata McGraw Hill Education ,2002

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III YEAR – VI SEMESTER
COURSE CODE: 7BCEE3B

ELECTIVE COURSE-III (B)–PROGRAMMING WITH LINUX, APACHE, MYSQL, AND PHP (LAMP)

Unit I

Installing and Configuring of Apache Web Server, MySQL and PHP on platforms Linux and Windows.

PHP: Variables, Data types, Operators and expressions, Constants, Switching flow, Loops, Code blocks and browser Output.

Unit II

Working with Functions,Defining and calling a function, Returning values, Variable scope, Static Statement, More about arguments, Testingthe existence of a function.

Arrays: Creating Arrays, array Related Functions.

Objects: Creating an Object, Object inheritance.

Strings Formatting, Investigating and Manipulating with PHP,Date and Time functions in PHP, Other String, Date and Time Functions.

Unit III

Creating a Simple Input Form, Accessing Form Input with User-Defined Arrays, Combining HTML and PHP Code on a Single Page, Using Hidden Fields to Save State, Redirecting the User, Sending Mail on form Submission, Working with File uploads, Working with Cookies, User Sessions, Files, Directories and Images Introducing Cookies, Setting a Cookie with PHP, Deleting a Cookie with PHP Session Function(s) Overview, Starting a Session, Working with Session Variables, Passing Session IDs in the Query String, Destroying Sessions and Un-setting Variables, Using Sessions in an Environment with Registered Users

Unit IV

Including Files with include(), Validating Files, Creating and Deleting Files, Opening a File for Writing, Reading or Appending, Reading from files, Writing or Appending to a file Working with Directories Opening Pipes to and from Processes Using popen(), Executing System Commands

Understanding the Image Creation Process, Necessary Modifications to PHP, Drawing a New Image, Getting fancy with Pie Charts, Modifying Existing Images, Image Creation from User Input, Using Images Created by Scripts

Unit V

Learning the MySQL Data Types andtable creation, Insert, Select, Update, Replace and Delete Commands Frequently used String functions in MySQL, Using Date and Time functions in MySQL, Using Transactions and Stored Procedures in MySQL.

Interacting with MySQL using PHP, MySQL Versus MySQL Functions, Connecting to MySQL with PHP, Working with MySQL Data

Text Books:

1. Julie C Meloni, “Sams Teach Yourself PHP, MySQL and Apache All in One” 4th edition, Pearson Education
2. Jeremy McPeak Beginning JavaScript Wrox Publication

Books for Reference:

1. James Lee and Brent Ware, “Open source web development with LAMP” , Pearson Education
2. Jason Gerner, Morgan Owens, Elizabeth Naramore, Matt Warden, “Professional LAMP: Linux, Apache, MySQL and PHP5 Web Development” WROX Publication
3. PHP6 and MySQL Bible –Steve Suehring, Tim Converse and Joyce Park – Wiley India Edition.
4. PHP and MySQL Web Development – Luke Welling, Laura Thomson – Pearson
5. Beginning Ajax with PHP From Novice to Professional, By Lee BabinApress
6. Head First AJAX by Rebecca Riordan , O’Reilly Media
7. Head First PHP& MySQL by Lynn Beighley, Michael Morrison, O’Reilly Media
8. Head First jQuery by Ryan Benedetti and Ronan Cranley, O’Reilly Media
9. Learning jQuery By Jonathon chaffer and Karl Swedberg, O’Reilly Media
10. List of Software/Learning Websites
    1. http://www.codecademy.com/learn
    2. https://www.udemy.com/learn-html5-programming-from-scratch/
    3. http://www3schools.com
    4. http://www.tutorialspoint.com/ajax/
    5. http://www.tutorialspoint.com/jquery/
    6. http://www.tutorialspoint.com/php

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B.Sc. MATHEMATICS

I YEAR - I SEMESTER
COURSE CODE: 7BMAA1

ALLIED COURSE - I – ANCILLARY MATHEMATICS I

Unit – I

Matrices – Characteristic Equation and Cayley Hamilton Theorem (Proof not included) – Finding the inverse of a matrix using Cayley – Hamilton Theorem – Eigen values and Eigen vectors.

Unit – II

Equations of the first order but of Higher Degree – Equations solvable for dy / dx – Equations solvable y, x – Clairaut's form – Linear equations with constant coefficients – Finding the complementary function and particular integral of the type $e^{ax,}$cos ax, sinax.

Unit – III

Differential Calculus – Successive Differentiation – n^{th} derivative of standard functions (Derivation not needed) problems – Leibnitz formula for the n^{th} derivative of a product (proof not needed) simple problems only – curvature and radius of curvature in Cartesian coordinates only – problems.

Unit – IV

Integral Calculus – Integration by Parts – Bernoulli's formula – Definite integrals – properties – problems.

Unit – V

Trigonometry : Expression for sinnθ, cosnθ and tannθ, $\sin^n\theta$, $\cos^n\theta$ (n being a +ve integer) Expansion of sinθ, cosθ, tanθ in powers of θ (only problems in all the above)

Text Books:

1. Modern Algebra by Dr. S.Arumugam and A.ThangapandiIssac, Scitech Publications, Chennai, 2003.
2. Differential Equations and its Applications by S.Narayanan and T.K.ManickavachagomPillay, S.Viswanathan (Publishers & Printers) Pvt. Ltd., 2015.
3. Calculus VolumeI by S.Narayanan&T.K.ManicavachagomPillay, S.Viswanathan (Printers & Publishers) Pvt. Ltd, 2006.
4. CalculusVolumeII by S.Narayanan&T.K.ManicavachagomPillay, S.Viswanathan (Printers & Publishers) Pvt. Ltd, 2014.
5. Ancillary Mathematics Paper I (Revised) by. S.Arumugam and A.ThangaPandi Isaac, New Gamma Publishing House,Palayamkottai,2002

Unit I	Chapter 7sections 7.7 & 7.8 of (1)
Unit II	Chapter 4 sections 1, 2.1, 2.2, 3.1 of (2) Chapter 5 sections upto 4.2 (b) of (2)
Unit III	Chapter 3sections 1.2, 1.3, 2.1, 2.2 (problems only) of (3) Chapter 10 sections 2.1 & 2.3 of (3)
Unit IV	Chapter 1 sections 11, 12, 15.1 of (4)
Unit V	Chapter 4 sections 4.1, 4.2, 4.3 of (5)

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I YEAR - II SEMESTER
COURSE CODE: 7BMAA2

ALLIED COURSE - II – ANCILLARY MATHEMATICS II

Unit – I

Vector Calculus – Vector Differentiation – Gradient – Divergence – Curl – Properties – Results.

Unit – II

Linear equations with constant coefficients with Right hand side of the from e^{ax} v where vis any function of $x – x^m$ (a power of x) m being a positive integer – Linear equations with variable coefficients (Homogeneous Differential Equations only)

Unit – III

Fourier Series – Definition – Fourier Series Expansion of Periodic Functions with Period 2π – Even and Odd functions – Half range Fourier Series – Problems.

Unit – IV

Interpolation – Newton's Interpolation formula – Central Difference Interpolation formulae – Lagrange's interpolation formulae.

Unit – V

Correlation – Rank Correlation – Regression lines and Regression coefficients.

Text Books:

1. Analytical Geometry of Three Dimensions and Vector Calculus by Dr. S.Arumugam and A.Thangapandi Issac, New Gamma Publishing House, Palayamkottai, Reprint 2006.
2. Differential Equations and its Applications by S.Narayanan and T.K.Manicavachagom Pillay, S.Viswanathan (Printers and Publishers) Pvt. Ltd., 2015.
3. Calculus Volume III by S.Narayanan &T.K.Manicavachagom Pillay, S.Viswanathan Printers & Publishers, 2014.
4. Numerical Analysis with Programming in C by Dr. S.Arumugam, A.Thangapandi Issac and Dr. A.Somasundaram, New Gamma Publishing House, Palayamkottai, June, 2013.
5. Statistics by Dr. S.Arumugam and Mr. A.Thangapandi Issac, New Gamma Publishing House, Palayamkottai.

Unit I	Chapter 5 sections 5.1 to 5.4 of (1)
Unit II	Chapter 5 section 4.2(c),(d);sections 5.1 to 5.5 of (2)
Unit III	Chapter 6 sections 1 to 4, 5.1, 5.2 of (3)
Unit IV	Chapter 4 sections 4.1 to 4.3 of (4)
Unit V	Chapter 6 sections 6.1 to 6.3 of (5)

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II YEAR - III SEMESTER
COURSE CODE: 7BMAA3

ALLIED COURSE - III – ANCILLARY MATHEMATICS III

Unit – I

Partial Differential Equations – Formation of Partial Differential Equations by eliminating arbitrary constants and arbitrary functions – Complete, Particular, Singular and General integral.

Unit – II

Solving Lagrange's linear equation $Pp + Qq = R$,Solution of equations of Standard types $f(p, q) = 0$, $z = px + qy + f(p, q)$, $f(z, p, q) = 0$, $f_1(x, p) = f_2(y, q)$.

Unit – III

Laplace Transform – Definition – Laplace transform of some Standard Functions – problems – Inverse Laplace Transform – Standard formulae – problems.

Unit – IV

Numerical Differentiation – Derivatives using Newton's Forward Difference formula – Derivatives using Newton's Backward Difference formula – Derivatives using Newton's Central difference formula – Maxima and Minima of the interpolating polynomial.

Unit – V

Beta and Gamma functions – Relations between them – Evaluation of multiple integrals using Beta and Gamma functions.

Text Books:

1. Differential Equations and Applications by Dr. S.Arumugam and A.ThangapandiIssac, New Gamma Publishing House, Palayamkottai, Edition 2014.
2. Numerical Analysis with Programming in C by Dr. S.Arumugam, Prof. A.ThangapandiIssac& Dr. A.Somasundara, New Gamma Publishing House, Palayamkottai, Edition, 2013.
3. Calculus Volume II by S.Narayanan and T.K.ManicavachagomPillay, S.Viswanathan (Printers & Publishers) Pvt. Ltd, 2014.

Unit I	Chapter 4 sections 4.1 & 4.2 of (1)
Unit II	Chapter 4 sections 4.3, 4.4 of (1)
Unit III	Chapter 3 sections 3.1 & 3.2 of (1)
Unit IV	Chapter 5 of (2)
Unit V	Chapter 7 sections 2,3,4 &5 of (3)

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II YEAR - IV SEMESTER
COURSE CODE: 7BMAA4

ALLIED COURSE - IV – OPTIMIZATION TECHNIQUES

Unit – I

Origin and Development of O.R. – Definition of O.R. – Linear Programming – Mathematical formulation – Graphical method – Problems.

Unit – II

Simplex method using Slack and surplus variables.

Unit – III

Transportation Problem – Definition – Finding initial basic feasible solution by North – West Corner rule – Least Cost method – Vogel's Approximation method.

Unit – IV

Assignment problem – Definition – Finding optimal solution by using Hungarian method.

Unit – V

Sequencing Problem – Processing n jobs through two machines – processing n jobs through K machines – problems.

Text Book:

1. Operations Research (14^{th} edition) by Kanti Swarup, P.K.Gupta & Man Mohan, Sultan Chand & Sons, Publishers, New Delhi, 2008.

Unit I	Chapter 1sections 1.1 to 1.3 Chapter 2 sections 2.1 to 2.4 Chapter 3 sections 3.1 to 3.3
Unit II	Chapter 3 sections 3.4 & 3.5 Chapter 4 sections 4.1 to 4.3 (Theorems not included)
Unit III	Chapter 10 sections 10.1 – 10.3, 10.5, 10.8, 10.9
Unit IV	Chapter 11 sections 11.1, 11.2 & 11.3
Unit V	Chapter 12 sections 12.1 – 12.5

Books for Reference:

1. Operations Research (2^{nd} edition) by P.K.Gupta and D.S.Hira, S.Chand& Co., New Delhi, 2004.

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PART IV (2) – SKILL BASED SUBJECTS (SBS)
GROUP I – SET I
II YEAR – III SEMESTER
COURSE CODE: 7SBS3A1

COURSE I – COMPETITIVE EXAMINATION SKILLS

Objectives:

- To build a sense of awareness among students through proper guidance about various competitive examinations in order to motivate students for prospective career in government and corporate sector.
- To intensively guide students for competitive examinations like TNPSC, UPSC, SSC, RRB, IBPS etc.

Unit I

Public Service Commission: Tamil Nadu Public Service Commission (TNPSC) and its role - History of TNPSC - Constitutional Provisions on the Formation, Functions, and Powers of Public Service Commissions for the Union and for the States - TNPSC and its rules of Procedure.

Eligibility and examination pattern: TNPSC - Union Public Service Commission (UPSC) - Staff Selection Commission (SSC) - Railway Recruitment Board (RRB) – Institute of Banking Personnel Selection (IBPS).

Unit II

Intelligence, creativity & application, testing & assessment - Types, verbal abilities & fluency

Unit III

Numerical ability:

Numbers, simplification, time and work, percentage, fraction, speed and distance, simple and compound interest, ratio and proportion

Unit IV

Spatial and perceptual abilities, situation reaction test

Unit V

Memory and inductive reasoning, Logical reasoning, Coding and Decoding, Direction Test, Syllogism

Books for Reference:

1. Ajay rai, “intelligence tests”, sterling paperbacks, published by sterling publishers pvt. Ltd., l-10, green park extension, new delhi 110 016., 2001
2. Competition success review magazines.

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GROUP I – SET I

II YEAR – III SEMESTER
COURSE CODE: 7SBS3A2

COURSE II – EXECUTIVE SKILLS

Objectives:

- To understanding good leadership behaviors
- To prepare themselves for training after reviewing administrative matters and making introduction
- To understand qualities and strengths
- To understand housekeeping and documentation skill

Unit I

Professionalism: professional approach & behaviour – rational vs. Emotional decisions – analysis of self-competence and self confidence – qualities of an effective executive

Unit II

Corporate etiquette: dressing occasions – formal – semi formal and informal – eating habits– table manners – body language: kinesics and proximity

Unit III

Housekeeping skills: cleanliness at work place – organizing the work table and shelves – spatial utility and energy saving habits – office files and personal computer / laptop management

Unit IV

Front office skills: reception and greeting – telephone manners – effective visitor appointments management – preparation to attend office meetings – preparation to hold office meetings

Unit V

Documentation: objectives, report writing, how to write minutes, preparation methods, and report for media?

Books for Reference:

1. Naveen kumar, sudan a. S; managerial skill development, first edition (2004), anmol publications
2. Lesikar & flatley, basic business communication, new delhi: tata mcgraw hill
3. www.executiveworld.com
4. www.selfconfidence.co.uk
5. www.senselang.com

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GROUP I – SET I

II YEAR – III SEMESTER
COURSE CODE: 7SBS3A3

COURSE III – DISASTER MANAGEMENT

Objectives:

- To provide students an exposure to disaster, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction.
- To gain a preliminary understanding of approaches of disaster risk reduction (drr)
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live with due sensitivity.

Unit-I
Introduction to disasters

Concepts, and definitions (disaster, hazard, vulnerability, resilience, risks)

Unit –II
Disasters: classification, causes, impacts

Including social, economic, political, environmental, health, psychological, etc., Differential impacts- in terms of caste, class, gender, age, location, disability global trends in disasters urban disasters, pandemics, complex emergencies, climate change.

Unit – III
Approaches to disaster risk reduction

Disaster cycle – its analysis, phases, culture of safety, prevention, mitigation and preparedness, community based DRR, structural – non structural measures, roles and responsibilities of community, panchayati raj institutions/ urban local bodies (PRIs/ULBs), states, centre, and other stake-holders.

Unit –IV
Inter-relationship between disasters and development

Factors affecting vulnerabilities, differential impacts, impact of development projects such as dams, embankments, changes in land-use etc. Climate change adaption. Relevance of indigenous knowledge, appropriate technology and local resources.

Unit –V
Disaster risk management in India

Hazard and vulnerability profile of India
Components of disaster relief: water, food, sanitation, shelter, health, waste management

Institutional arrangements (mitigation, response and preparedness, dm act and policy, other related policies, plans, programmes and legislation).

Books for Reference:

1. Alexander David, Introduction in ‘ Confronting Catastrophe’, Oxford University Press, 2000
2. Andharia J. Vulnerability in Disaster Discourse, JTCDM, Tata Institute of Social Sciences Working Paper no.8, 2008
3. Blaikie, P, Cannon T. Davis Ii, Wisner B 1997. At Risk Natural Hazards, peoples’ Vulnerability and Disaster, Routledge.
4. Coppola P Damon, 2007, Introduction to International Disaster Management.
5. Carter, Nick 1991. Disaster Management: A Disaster Manager’s Handbook. Asian Development Bank, Manila Philippines.
6. Cuny, F. 1983. Development and Disasters, Oxford University Press.
7. Document on World Summit on Sustainable Development 2002.
8. Govt. of India: Disaster Management Act 2005, Government of India, New Delhi.
9. Government of India, 2009. National Disaster Management Policy,
10. Gupta Anil K, Sreeja S. Nair. 2011 Environmental Knowledge for Disaster Risk, Management, NIDM, New Delhi
11. Indian Journal of Social Work 2002. Speical Issue on Psychological Aspects of Disasters, Volume 63, Issue2, April.
12. Kapur, Anu & others, 2005: Disasters in India Studies of grim reality, Rawat Publishers, Jaipur.
13. Parasuraman S, Acharya Niru 2000. Analysis forms of vulnerability in a disaster, The Indian Journal of Social Work, vol 61, issue 4, October.
14. Pelling Mark, 2003, The Vulnerability of Cities: Natural Disaster and Social Resilience Earthscan publishers, London.
15. Reducing risk of disasters in our communities, Disaster theory, Tearfund, 2006.
16. UNISDR, Natural Disasters and Sustainable Development: Understanding the links between Development, Environment and Natural Disasters, Background paper No.5. 2002.
17. IFRC, 2005. World Disaster Report: Focus on Information in Disaster, PP.182-225.

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GROUP I – SET II

III YEAR – V SEMESTER
COURSE CODE: 7SBS5A4

COURSE I – ENTREPRENEURIAL DEVELOPMENT SKILLS

Objectives:

- To learn the concepts, principles of entrepreneurship and to develop entrepreneurial interest and qualities
- To impart the process and procedure involved in setting up of a small enterprise and to acquire the necessary managerial skills to run a small-scale industry

Unit I

Concept of Entrepreneurship and basics of selection of project/business

Qualities of an entrepreneur – Classification of industries as tiny, small, medium and large Infrastructure facilities, threats and Opportunities-Corporate Social Responsibility

Unit II

Preparation of Project Proposal

Introduction to nature of business – techniques of market survey – goal setting, funding institution, departmental licenses and clearance – production capacity – fixed capital – working capital and total investment – costing, pricing, profit assessment – return on capital investment, Break Even Point and Cash Flow

Unit III

Marketing skills

Salesmanship, credit sales, customer management, negotiation skills, business tie ups, export possibilities and policies

Unit IV

Management of Men, Materials, Money, Machine and Methods (the 5Ms)

Management of man power, problem solving, purchasing techniques, inventory management– Quality control and standards – resource mobilization – Financial planning, record keeping and accounting, knowledge of employees' welfare measures – plant selection and layout.

Unit V

Industrial Management

Technology up gradation – value addition – diversification – utilization of waste and by products – concepts of zero discharge

Books for Reference:

1. Entrepreneurial Development – S.S.Khanna, S.Chand & Co.
2. Entrepreneurial & Management of Small Business – CED, Madurai – 10.
3. Entrepreneurship Development – S.P.Saravanan, Sul

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GROUP I – SET II

III YEAR – V SEMESTER
COURSE CODE: 7SBS5A5

COURSE II – HERITAGE AND TOURISM

Objectives:

- To understand the definitions, terminology and concepts of cultural heritage and its relationships with tourism.
- To Understand heritage tourism supply by examining different categories of heritage attractions and the contexts within which heritage exists and additional perspectives on scale from the supply perspective
- To understand the role of interpretation in cultural heritage sites and the relevance of such interpretation approaches to visitors.
- Provide a framework to plan, design, and assess interpretation programs for tourists

Unit I

Tourism – Introduction – Concepts – Significance – Forms of Tourism – Effects of Tourism – Social, Economic and Environmental aspects – Human Rights

Unit II

Importance of preserving heritage – Heritage Spots in India – In Tamil Nadu – Brief history of the heritage spots – The role of heritage spots in promoting tourism – UNESCO guidelines on Heritage

Unit III

Role of Government in promoting tourism – ITDC- TTDC-Palace on wheels – Travel industry service network – Land (rail and road) Air – Water – Travel Agency – Hospitality and Accommodation

Unit IV

Travel Guide – Features – requirements – One's role as a guide – Income and Employability – Qualities and skills of a professional travel or tourist guide

Unit V

Project work – Field visit to heritage and tourism spots in Sivagangai and Ramanathapuram Districts and submission of a report (15 to 25 pages)

Books for Reference:

Bhatia, A. K – Tourism Development Principles and Practices, (Sterling Publishers (P) Ltd., New Delhi)

Ananand M. M – Tourism and Hotel Industry in India (Sterling Publishers (P) Ltd., New Delhi)

Acharya Ram – Tourism and Cultural Heritage (Rosa Publications: Jaipur, 1986)

Jha, S.M – Tourism Marketing (Himalaya Publishing House)

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GROUP I – SET II

III YEAR – V SEMESTER
COURSE CODE: 7SBS5A6

COURSE III – MARKETING AND SALES MANAGEMENT

Objectives:

- To acquire analytical skills for solving marketing related problems and challenges and to familiar with the strategic marketing management process
- To learn the elements of sales force to be an effective component of an organization's overall marketing strategy.

Unit I

Introduction: Evolution of Marketing – Types of Marketing: Consumer Products Marketing, Industrial Marketing and Services Marketing – Demographic and Behavioural Dimensions of Marketing – Marketing Planning

Unit II

Basics of Market Segmentation, Targeting and Positioning – Components of The Marketing Mix: Product – Price – Place – Promotion – Distribution Channels: Types – Merits and Demerits

Unit III

Marketing Vs Selling – Nature and Scope of Sales Management – Personal Selling and Salesmanship – Selling Function – Understanding Consumer's Decision Making Process – Sales Organization and Types Of Selling

Unit IV

Prospecting – Approaching The Customer – Sales Presentation – Sales Demonstration – Negotiating Buyer Concerns – Closing The Sale – Post Sales Service and Complaint Handling

Unit V

Modern Trends in Marketing and Sales: Internet Marketing – Direct Marketing – Multi Level Marketing – Relationship Marketing – Selling through Kiosks

Books for Reference:

1. Chunawalla, S. A., Sales Management, 5th Edition (2007), Himalaya Publishing House
2. Havaldar, Krishna; Sales And Distribution Management, 1st Edition (2006), Tata Mcgraw Hill
3. Perreault, Jr., William; Mccarthy, E. Jerome, Basic Marketing, 15th Edition, 2006, Tata Mcgraw Hill

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GROUP I – SET II

III YEAR – V SEMESTER
COURSE CODE: 7SBS5A7

COURSE IV – URBAN PLANNING

Objectives

- To expose the students the various aspects of urban planning.
- To provide students an exposure to development plans, plan formulation and evaluation.
- To gain a preliminary understanding of urban forms, size and infrastructure

Unit I Introduction to urban planning

Urban planning and development- definition of terms- explanation of concepts- trends of urbanization- international, national and regional level- positive and negative impacts of urban development.

Unit II Planning process

Various definitions of town and country planning - principles of planning- types and levels of urban plans- stages in planning process- goals and objectives of planning - delineation of planning areas- surveys and analysis.

Unit III Development plans, plan formulation and evaluation

Scopes and content of regional plan- definition of development plan; types of development plans: master plan, city development plan, structure plan, district plan, action area plan, subject plan, town planning scheme, regional plan, sub-regional plan; planning of industrial estates development strategies- formulation and evaluation.

Unit IV Urban forms, size and infrastructure

Obligatory and discretionary services - implication of urban form and size on services - norms and standards - national and local guidelines - recommendations of rakesh mohan committee.

Unit V Essential Services

Demand strategy, issues and tasks, operation and management aspects of each service– water supply, sewerage / drainage, solid waste management, roads and street lighting and living environment.

Books for References:

1. Karat Singh, “Rural Development, Principles, Policies And Management Stages”, Sage Publication India Pvt.Ltd, 2009
2. George Chanwick, “A System View Planning”, Pergamon Press,Oxford1978
3. Cpheeri, M/C Ua, ‘ Manual On Water Supply And Sewerage’, New Delhi, 1991
4. Dhaliwal S.S, ‘Urban Infrastructure Development In Small And Medium Towns’ Deep And Deep Publications, 2004.

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GROUP II – SET I

II YEAR – IV SEMESTER
COURSE CODE: 7SBS4B1

COURSE I – ACCOUNTING SKILLS

Objectives:

- To introduce basic Accounting principles, ethics in accounting and preparation of financial statements.
- To analyze the business problem by incorporating diverse perspective of accounting techniques and to develop competent decision skills in the areas of accounting

Unit I

Introduction to Accounting – Accounting principles – Accounting equation – Double entry system – Characteristics – Classification of Accounting principles.

Unit II

Books of Accounting – Journal – Accounting Process – Classification of Accounts – Compound Journal Entries – Important consideration for recording transaction

Ledger: Difference between Journal & Ledger – Cashbook and Subsidiary Books – Purchase Books – Invoice, Sales Book, Return Book, Debit and Credit notes

Unit III

Trial balance: Meaning of Trial Balance, Objective and Importance of Trial Balance

Errors: Meaning and location of Errors.

Unit IV

Financial Accounts: Meaning and typing of Financial Statements, procedure for preparing accounts – Profit and Loss Accounts – Balance Sheet – Manufacturing Account – Adjustment and treatment of adjustment.

Unit V

Introduction to Accounting Package – Introduction to Tally: Features, advantages, defining the cells, format the data, entering data, functional keys and simple calculation – Excel: features, advantages, defining the cell range, functional keys, entering the data, defining the functions and simple calculations.

Text Book:

1. M.C.Shakla, T.S.Grawal and S.C.Gupta – "Advanced Accounts" S. Chand & Company Ltd, New Delhi, Fourteenth Edition, 1999.

Books for Reference:

1. Mukesh Mahajan, P.S.Gills, V.P.Sharma and H.S.Punia, Fundamentals of Accountancy, Unistar Books Pvt. Ltd., Chandigarh, 2001.
2. Sundeep Sharma, Principles of Accounting (A Complete Hand Book), Shree Niwas Publication, Jaipur, First Edition, 2004.
3. Douglas Garbutt, Accounting Foundation (An Introductory), Pitman, Publishing Limited, London, First Edition, 1980.

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GROUP II – SET I

II YEAR – IV SEMESTER
COURSE CODE: 7SBS4B2

COURSE II – EMERGENCY AND MEDICAL LAB SKILLS

Objectives:

- To recognize the nature and seriousness of the patient's condition or extent of Injuries to assess requirements for emergency medical care
- Administer appropriate emergency medical care based on assessment findings of the patient's condition
- To Perform safely and effectively the expectations of the job

Unit I

First Aid – Fracture and Fire
First Aid – Drowning and Snake animal, rodent bites.
First Aid – Diarrhoea, Dysentery and Heat Stroke

Unit II

Traffic Rules
Road accidents: precautions, preventions & emergency steps to be taken on the spot advantages of 108 ambulance.

Unit III

Basic Clinical lab Tests
Blood, Urine, saliva, stool Tests

Unit IV

Awareness Programmes on the importance of locally available herbal plants and Vegetables. Skin lashes poor eye-sight anemia

Unit V

Project on Locally available native treatments for various Health Problems (Project Report 15 to 25 Pages)

Books for Reference:

1. Era.Su.Muthu and Meera Ravishankar, "First Aid", aug-2013 published by Sura Books (PVT) Ltd., 1620, 'J' Block, 16th Main Road, Anna Nagar, Chennai – 600 040.
2. Dr.Rama Rao, "Handbook of First Aid", Chennai.

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GROUP II – SET I

II YEAR – IV SEMESTER
COURSE CODE: 7SBS4B3

COURSE III – YOUTH RED CROSS

Objectives:

- To make the students to know about the birth, organizational set up, principles, emblem and activities of Red Cross society and to develop leadership traits

Unit I: History and Organization of Red Cross Society:

Henry Dunand – memories of Salbarino – Origin of Red Cross Society – Geneva Convention IRCS – Organization – objectives – Administrative structure – Organizational set up of Indian Red Cross Society

Unit II: Principles of Red Cross Society, Emblem and its uses:

Humanity – Impartiality – Neutrality – Independence – Voluntary service – Unity – Universality Aims of Emblem – Red Cross – Red Crescent – protective use – indicative use – abuse

Unit III: IRCS activities and YRC:

Mission: Indian Red Cross Society - Organizational Structure of IRCS Junior/Youth - Formation procedure at Indian Red Cross Society, National Headquarters -Types of conflicts & National Disasters – Role of Red Cross Society in relief activities Youth Red Cross Movement – origin – objectives – organization – activities

Unit IV: Leadership Development:

First war of Indian Independence – Gandhiji and Non Violence – Nethaji and INA Leadership – types and traits – Man management Duty and discipline, factors affecting duty and discipline Indian Citizenship – duties and responsibilities

Unit V: Civil Defence and Self Defence:

Civil defence – organization – aim and services – aid to civil authorities in emergency Fire fighting – types of fire, spreading of fire, fire extinguishing and equipments Self defence – unarmed combat – attacking and throws – vital parts of human body .

Books for Reference:

1. Nagendran, N.A. A guide to Youth Red Cross Society. Thiagarajar College, Madurai.

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GROUP II – SET II

III YEAR – VI SEMESTER
COURSE CODE: 7SBS6B4

COURSE II – FRUIT AND VEGETABLE PRESERVATION SKILLS

Objectives:

- To understand the science, principles and techniques involved in fruits and vegetables preservation techniques
- To impart thorough knowledge on the technical skills in various aspects of food processing and preservation

Unit I

Principles, Methods, types of Preservation.
Preservation media and mode of action of preservation. Traditional & Modern methods.

Unit II

Study of various types of equipments – care & precautions and usage.
Study of various types of containers.

Unit III

Vegetables & their product preservation Methods
Importance of personal hygiene and sanitary standards

Unit IV

Fruits & their preservation

Unit V

Project:

1. Mapping of preservation practices & centre's

(or)

2. Preservation practices specific to fruits & Vegetables in your area
   (Project Report 15 to 25 Pages)

Books for Reference:

1. Srivastava R.P. and Kumar.S "Fruit and Vegetable Preservation: Principles"
2. Ranjit Singh "Fruits" National Book Trust.
3. Girdhari Lal Tandon et al "Preservation of Fruit and Vegetable Products".

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GROUP II – SET II

III YEAR – VI SEMESTER
COURSE CODE: 4SBS6B5

COURSE III – EQUIPMENT HANDLING SKILLS FOR EVENTS

Objectives:

- To impart the characteristics of various types of electrical and electronic equipments used in events
- To learn about the working, handling and troubleshooting skills on various electrical and electronic gadgets

Unit I

Event that require different electrical & electronic gadgets – Positioning mikes, speakers, LCD Projectors collar mikes & screen

Unit II PA System and Audio Recording

Components of PA System – Working principles of amplifier, mike and speaker – Wiring system trouble shooting and rectification – tape recorders and principles of operation – troubleshooting and maintenance

Unit III VCD/DVD Handling and Videography

Operating principles of VCD and DVD – TV connection – principles of Videography – operation of video-cameras

Unit IV LCD Operations and Power-Point Presentation

Principles of LCD – mode setting – visibility adjustments – computer incorporation – power point presentation

Unit V Photography and Image Editing

Principles – manual and digital cameras – view setting and focus – computer interface – image editing – CD writing.

Books for Reference:

1. "Using Information Technology" Williams Sawyer, Hut Chinson Tata Mc Graw-Hill
2. "Introduction to Information System" James A.O.Bries Tata Mc Graw-Hill
3. "Digital Image Processing" Rafael C. Gonzalez Richard E Wood, Prentice Hall of India

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GROUP II – SET II

III YEAR – VI SEMESTER
COURSE CODE: 7SBS6B6

COURSE IV- NATIONAL SERVICE SCHEME(NSS)

Objectives:

- To enable the students to understand the community in which they work
- To develop among themselves a sense of social and civic responsibility
- To develop competence required for group-living and sharing of responsibilities
- To acquire leadership qualities and democratic attitude
- To develop capacity to meet emergencies and national disasters
- To practice national integration and social harmony.

Unit I:

Introduction to NSS :Orientation and structure of NSS - The history of NSS- Objectives- Symbol and meaning- NSS hierarchy from national to college level,

Regular activities: Distribution of working hours- association between issues and programs- community project- urban rural activities, association- modes of activity evaluation-concept of society- development of Indian society - Features- Division of labours and cast system in India

Unit II:

Features of Indian constitution: Provisions related to social integrity and development,

Social Justice: The concept- features - Inclusive growth- the concept- feature,

Basic social issues in India: Degeneration of value system, family system - Gender issues - Regional imbalance

Unit III

Special campaigning activity :Concept of camp: Identification of community problems- importance of group living- team building- adaption of village- planning for camp- pre, during and post campaigning activities

Unit IV

Training and orientation of the program unit in college: Leadership training – formation of need based programs- concept of campus to community(C To C) activities

Unit V

Social Integration: Meaning of value and types- human values and social responsibilities Indian Value system: Understanding of society, Physical: Physical exercise, Yoga, etc, **Cultural:** Basics of performing arts as tool for social awareness, street play, creative dance, patriotic song, Folk song and folk dance- National integration.

Books for Reference:

1. National Service Scheme Manual (Revised),Ministry of Human Resource Development of India.
2. Guidelines from Ministry of Human Resource Development of India. (Downloaded from the Website of Ministry of HRD, Govt. of India).

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GROUP II – SET II
III YEAR – VI SEMESTER
COURSE CODE: 7SBS6B7
COURSE IV- NATIONAL CADET CORPS(NCC)

Objectives:

- After going through this unit, the students would be able to gain an insight into aims and objectives of NCC.
- Explore the importance of NCC in nation building.
- Understand the concept of National Integration and its importance.

Unit – I

National Cadet Corps(NCC)-Introduction to NCC- Genesis –Objectives of NCC- Concept of Training in NCC- Organization of the NCC – Associate NCC officers – Cert Exam.

Unit –II National Integration:

National interests, Objectives, Threats and Opportunities. Religions, culture, traditions and customs of India, Importance and necessity. Freedom struggle and nationalist movement in India **Drill:**Foot drill, Arms drill, Ceremonial drill, Qualities of immediate and implicit obedience of orders.

Unit-III Social Awareness and Community Development:

NGO's Role and Contribution, Drug abuse and trafficking, Basics of social service and its need, Civic responsibility, Contribution of youth towards social welfare, Rural development programmes.

Unit –IV Environmental Awareness and Conservation:

Natural resources conservation and management, Water conservation and rain water harvesting, Hygiene and sanitation, structure and function of the human body, infectious and contagious diseases and its prevention.

Unit –V Personality Development and Leadership:

Introduction to personality development, self awareness, communication skills, Leadership traits, Time management.

Books for Reference:

1. Anonymous. 1995. Officers training manual. PRECIS, NCC, OTS, Kamptee
2. Bose, R and Faust, L. 2011. Mother Teresa, CEO, Unexpected Principles for Practical Leaders, Tata McGraw Hill Publications, New Delhi.
3. Ganapathi, R. 2003. Swami Vivekanandar, Ramakrishna Math Press, Chennai.
4. Gandhi, M.K. 1983. An Autobiography or The story of My Experiments with Truth, Navajivan Publishing House, Ahamedabad
5. Gupta, S.K. and Joshi, R. 2008. Human Resource Management, Kalyani Publishers, New Delhi.
6. Kalam, A.P.J. 1999. Wings of Fire, University Press, Hyderabad
7. Mishra, R.C. 2000. A Hand book of NCC, Kanti Prakashan, Etawah.Precis
8. Rana, B.S 2004. Maharana Pratap, Diamond Books (P) Ltd., New Delhi. Rana, B.S. 2004. Chatrapati Shivaji, Diamond Books (P) Ltd., New Delhi

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PART-IV (3)

COURSE CODE: 7BES2
I YEAR – II SEMESTER

COURSE – ENVIRONMENTAL STUDIES

Unit I The Multidisciplinary Nature of Environmental Studies

Definition, Scope and importance
Need for public awareness

Unit II Natural Resources

Renewable and non-renewable resources

a) Forest Resources: Use and over-exploitation, deforestation, case studies, Timber extraction, mining, dams and their effect on forests and tribal people
b) Water Resources: Use and over-Utilization of surface and ground water, floods, drought, conflicts over water, dams- benefits and problems.
c) Mineral resources: Use and exploitation, experimental effects of extracting and using mineral resources, case studies.
d) Food resources: world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy resources, Case studies.
f) Land resources: Land as a resource, land degradation, main induced landsides, soil-erosion and desertification
    - Role of individual in conservation of natural resources
    - Equitable use of resources for sustainable lifestyle

Unit III Ecosystems, Bio-diversity and its conservation

Ecosystems

- ✓ Concept of an Ecosystem
- ✓ Structure and function of an Ecosystem
- ✓ Energy Flow in the Ecosystem
- ✓ Food Chains, Food Webs and Ecological Pyramids

Biodiversity and its conservation

- ✓ Introduction- Definition: Genetic, Species and Ecosystem Diversity
- ✓ Bio-Geographical Classification of India
- ✓ Value of Biodiversity: Consumptive Use, Productive Use, Social Ethical, Aesthetic and Option Values.
- ✓ Biodiversity at Global, National and Local Levels
- ✓ India as a Mega-Diversity Nation
- ✓ Hot Spots of Biodiversity
- ✓ Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts
- ✓ Endangered and Endemic Species of India
- ✓ Conservation of Biodiversity in-Situ and Ex-Situ Conservation of Biodiversity

Unit IV Environmental Pollution

- Causes, Effects and Control measures of:-
    a. Air Pollution
    b. Water pollution
    c. Soil pollution
    d. Marine pollution
    e. Noise pollution
    f. Thermal pollution
    g. Nuclear hazards

Unit V Field Work

- Visit to a local area to document environmental assets–river/ forest/ grassland/ hill/ mountain
- Visit to a local polluted site- Urban/Rural/Industrial/Agricultural
- Study of common Plants, insects, birds
- Study of simple ecosystem-pond, River, Hill slopes, etc

Books for Reference:

1. Agarwal, K.C.2001 Environmental Biology, Nidi Publ.Ltd., Bikaner
2. Bharucha Erach The Biodiversity of India, Mapin Publishing Pvt. Ltd, Ahamedabad-380013,India, Email: mapin@cent.net®
3. Burner R.C. 1989, Hazardous Waste Inclineration McGraw Hill Inc.480p
4. Clark R.S. Marine Pollution, Clanderson Press Oxford(TB)
5. Cunnigham, W.P.Cooper, T.H.Gorhani, E& Hepworth, M.T 2001 Environmental Encylopedia, Jaico Publ. House, Mumbai, 1196p.
6. De.A.K.Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment®
8. Gleick H.P. 1993, Water in crisis, Pacific Instutue for studies in Dev, Environment & Security, Stockholm Env. Institute,Oxford Univ.Press,473p
9. Hawlinks R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
10. Heywood, V.H & Watson, R.T.1995, global biodiversity Assesment, Cambridge Univ.Press, 114op
11. Jadhav, H&Bhosale V.M.1995, Environmental Protection and Laws, Himalaya Pub; House, Delhi 284p
12. Mckinney, M.L & Schoch, RM.1996 Environmental Science systems& Solutions, web enhanced edition 639p
13. Mhaskar A.K.Matter Hazardous, techno-Science Publications(TB)
14. Miller T.G. Jr.Environmental Science wadsworth Publicing Co(TB)
15. Odurm, E.P.1971 fudamentalof Ecology, W.B.Saunders Co. USA 584p
16. Rao M.N & Datta, A.K., 1987, Tehchno-Science, Waste water Treatment. Oxford& IBH publ, Co.Pvt. Ltd.,345p
17. Sharma B.K. 2001, environemtal chemistry Goel publ,House,Meerut
18. Survey of the Environmental the Hindu(M)
19. Townsend C, harper J, and Michael Degon,Essential of ecology,Blakewell Science (TB)
20. Trivedi R.K., Hand book of Environmental laws, Rules, Guidelines, compliances and Standards, Vol I and II, Enviro Meida ®
21. Trivedi R.K. & P.K.Goel Introduction to Air pollution,Techno-Science Publications (TB)
22. Wanger K.D, 1998 Environmental Management W.B. Environmental Management. W.B.Saunders Co. Philadelphia, USA.499p

PART – IV (4)

II YEAR – IV SEMESTER
COURSE CODE: 7BVE4

COURSE – VALUE EDUCATION

Definition

The learning and practice of facts which have eternal value is what is contemplated by value education. It can also be the process by which a good citizen is moulded out of a human being. The evolution of a good human being is when he realises that his conscience shows to him the rightness of his action.

Objective

To create an awareness to values among learners and help them adopt them in their lives.

Unit I

Definition – Need for value Education – How important human values are – humanism and humanistic movement in the world and in India – Literature on the teaching of values under various religions like Hinduism, Buddhism, Christianity, Jainism, Islam, etc. Agencies for teaching value education in India – National Resource Centre for Value Education – NCERT– IITs and IGNOU.

Unit II

Vedic Period – Influence of Buddhism and Jainism – Hindu Dynasties – Islam Invasion – Moghul invasion – British Rule – culture clash – Bhakti cult – social Reformers – Gandhi – Swami Vivekananda – Tagore – their role in value education.

Unit III

Value Crisis – After Independence

Independence – democracy – Equality – fundamental duties – Fall of standards in all fields – Social, Economic, Political, Religious and Environmental – corruption in society.

Politics without principle – Commerce without ethics – Education without Character – Science without humanism – Wealth without work – Pleasure without conscience – Prayer without sacrifice – steps taken by the Governments – Central and State – to remove disparities on the basis of class, creed, gender.

Unit IV

Value Education on College Campus

Transition from school to college – problems – Control – free atmosphere – freedom mistaken for license – need for value education – ways of inculcating it – Teaching of etiquettes – Extra-Curricular activities – N.S.S., N.C.C., Club activities – Relevance of Dr.A.P.J. Abdual Kalam's efforts to teach values – Mother Teresa.

Unit V

Project Work

1. Collecting details about value education from newspapers, journals and magazines.
2. Writing poems, skits, stories centering around value-erosion in society.
3. Presenting personal experience in teaching values.
4. Suggesting solutions to value – based problems on the campus.

Recommended Books:

1. Satchidananda. M.K. (1991), "Ethics, Education, Indian unity and culture" – Delhi, Ajantha publications.
2. Saraswathi. T.S. (ed) 1999. Culture", Socialisation and Human Development: Theory, Research and Application in India" – New Delhi Sage publications.
3. Venkataiah. N (ed) 1998, "Value Education" New Delhi Ph. Publishing Corporation.
4. Chakraborti, Mohit (1997) "Value Education: Changing Perspectives" New Delhi: Kanishka Publications.
5. "Value Education – Need of the hour" Talk delivered in the HTED Seminar – Govt. of Maharashtra, Mumbai on 1-11-2001 by N.Vittal, Central Vigilance Commissioner.
6. "Swami Vivekananda's Rousing call to Hindu Nation": EKnath Ranade (1991) Centenary Publication
7. Radhakrishnan, S. "Religion and culture" (1968), Orient Paperbacks, New Delhi.

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II YEAR – IV SEMESTER
COURSE CODE: 7BMY4

COURSE – MANAVALAKALAI YOGA

VALUE EDUCATION
kdtsf;fiy Nahfh

A Brief Introduction about Manavalakalai Yoga

In the "Manavalakalai Yoga", practices formulated by Thathuvagani Vethathiri Maharishi do not have any bearing on religion, caste or creed. This is an education for culturing the mind. It does not contain any customary observances of any sect. It comprises only rational and scientific education and practices. These are offered to all people without any discrimination.

Learning and practicing Manavalakalai Yoga by students would help them to acquire physical health, mental acuteness, strength of life force and wisdom. Offering this yoga to students is the only means through which social welfare could be derived. On the whole, Manavalakalai Yoga would be of immense help to achieve a holistic life for any human folk.

"For education to be complete, it should include not only the training of the intellect but also the refinement of the heart and discipline of the soul" declared Dr.Radhakrishnan.

The heart of education is to educate the heart and such an education alone can lead too health, happiness and harmony. It is the need of the hour that the students of colleges and Universities and the general public be given a basic spiritual knowledge about their body, mind, soul, the cosmic link that runs through every system of the universe binding us all and above all, their duty to society of which every individual is a part. Every individual knowingly or unknowingly lives by the labours of the various sections of society and as a solemn duty it is imperative on our part back to the society as much as we can by labour of our body or mind or both. Our education to be socially relevant, it must inculcate in our youth this duty consciousness. Every institution has this obligation to the society.

The quality of Mind determines the quality of the Man. Mind can be considered to be the collective form of the thoughts arising spontaneously. An understanding of this leads to corrective measures on the thoughts and evolution of good thoughts only. Then only good thoughts, words and deeds and also other virtues would prevail among the students.

This course strives to achieve the following:

- To train and develop the physical body for leading a healthy life.
- To rejuvenate the life energy, to retard the ageing process and to achieve spiritual development
- To offer meditation practices and introspection so as to strengthen the mind, increase its will power, concentration, creativity and receptivity and ultimately to transform the mind to achieve self realization
- To help every individual to realize the enduring values of peace, non-violence and harmony to revitalize human society for restoring its sanity and strength

Annexure – II

Details of number of Centres and Yoga Masters in each District of Tamil Nadu

S. No.	District	Centres	Yoga Masters
1.	Ariyalur District	9	39
2.	Chennai District	127	676
3.	Coimbatore District	122	678
4.	Cuddalore District	50	212
5.	Dharmapuri District	22	118
6.	Dindigul District	41	186
7.	Erode District	101	506
8.	Kanchipuram District	109	522
9.	Kanniyakumari District	11	79
10.	Karur District	16	67
11.	Krishnagiri District	13	72
12.	Madurai District	29	182
13.	Nagapattinam District	16	64
14.	Namakkal District	34	185
15.	The Nilgiri District	37	172
16.	Perambalur District	21	88
17.	Pudukottai District	34	152
18.	Ramanathapuram District	15	79
19.	Salem District	75	403
20.	Sivaganga District	20	100
21.	Thanjavur District	66	306
22.	Theni District	18	101
23.	Thirunelveli District	98	457
24.	Thiruvallur District	68	303
25.	Thiruvannamalai District	34	222
26.	Thiruvarur District	66	276
27.	Tutikorin District	36	162
28.	Tiruchy District	77	379
29.	Vellore District	80	418
30.	Villupuram District	31	160
31.	Viruthunagar District	13	110
	Total	**1489**	**7667**

kdtsf;fiy Nahfh 80 Hours		
Units	**Title of the Paper**	**Hrs of Instruction**
Unit I Yoga and Physical Health (16 Hours)	1.1. Physical Structure of Human Body	4 hours
	1.2 Simplified Physical Exercises	4 hours
	1.3 Maharasanas	4 hours
	1.4 Yogasanas	4 hours
Unit II Art of Nurturing life Force and Mind (16 hours)	2.1 Maintaining Youthfulness	4 hours
	2.2 Sex and Spirituality	4 hours
	2.3 Ten Stages of Mind	4 hours
	2.4 Mental Frequency	4 hours
Unit III Sublimation (16 hours)	3.1 Purpose of life	4 hours
	3.2 Analysis of Thought	4 hours
	3.3 Moralization of Desire	4 hours
	3.4 Neutralization of Anger	4 hours
Unit IV Human Resource Development (16 hours)	4.1 Eradication of Worries	4 hours
	4.2 Benefits of Blessings	4 hours
	4.3 Greathness of Friendship	4 hours
	4.4 Individual Peace	4 hours
Unit V Law of Nature (16 hours)	5.1 Cause and Effect System	4 hours
	5.2 Purity of Thought and Deed	4 hours
	5.3 Love and Compassion	4 hours

VALUE EDUCATION
kdtsf;fiy Nahfh

80 Hours

Unit I Yoga and Physical Health

1.1 Physical Structure – Three bodies – Five limitations
1.2 Simplified Physical Exercises – Hand Exercises – Leg Exercises – Breathing Exercises – Eye Exercises – Kapalapathi
1.3 Maharasanas 1-2 Massages – Acu-puncture – Relaxation
1.4 Yogasanas – Padmasana – Vajrasanas – Chakrasanas (Side) – Viruchasanas – Yoga muthra – Patchimothasanas – Ustrasanas – Vakkarasanas – Salabasanas

Unit II Art of Nurturing the life force and Mind

2.1 Maintaining the youthfulness – Postponing their ageing process
2.2 Sex and Spirituality – Significance of sexual vital fluid – Married life – Chastity
2.3 Ten Stages of Mind
2.4 Mental frequency – Methods for concentration

Unit III Sublimation

3.1 Purpose and Philosophy of life
3.2 Introspection – Analysis of Thought
3.3 Moralization of Desires
3.4 Neutralization of Anger

Unit IV Human Resources Development

4.1 Eradication of worries
4.2 Benefits of Blessings
4.3 Greatness of Friendship
4.4 Individual Peace and World Peace

Unit V Law of Nature

5.1 Unified force – Cause and Effect system
5.2 Purity of Thought and Deed and Genetic Centre
5.3 Love and Compassion
5.4 Cultural Education – Five Fold Culture

VALUE EDUCATION
kdtsf;fiy Nahfh – Fwpg;G

,sk; taJ KjNy cliyAk;> kdijAk; gf;Ftkhf guhkhpf;f Ntz;baJ xt;nthUthpd; flikahFk;. ehk; cz;Zk; czT jhd; clyhf khw;wk; ngWfpwJ. mt;thW clyhf khw;wk;ngWk;nghOJ gy;NtW ,uhrad khw;wq;fs; njhlh;e;J eilngWfpd;wd. ,jdhy; tsh;r;rp> khw;wk;> jsh;r;rp Vw;gLfpd;wd. clk;gpy; xt;nthU nry;Yk; xU nghpa ,uhrad njhopw;rhiyNghy; nray;gLfpwJ. ,J rhpahf nray;gl clw;gapw;rp kw;Wk; Nahfrdq;fs; kpfTk; cWJizahf mikfpd;wd.

xt;nthU kdpjDk; 100 tUlk; Nehapd;wp tskhf thoKbAk;. clypy; caph; vd;w Mw;wy; El;gkhdJ. kfj;Jtk; tha;e;jJ. ,e;e capuhw;wy;jhd; midj;J ,af;fq;fSf;Fk; fhuzkhf ,Uf;fpwJ. capuhw;wiy Nkk;gLj;jpf; nfhs;tjw;Fk; ePz;l ehs; tho;tjw;Fk; cfe;j vspikahd gapw;rp Kiwfis xt;nthUtUk; Rygkhf njhpe;Jf; nfhz;L tho KbAk;.

kdk; ,y;yhj kdpjh;fs; ,y;iy. Mdhy; kdjpd; El;gq;fis KOikahf Ghpe;Jnfhz;l kdpjh;fSk; mjpfk; ,y;iy. MfNt kd xh;ikf;fhd gapw;rpia Nkw;nfhz;lhy; rhjhuz kdpjh;fSk; kdjstpy; cah;e;J tho KbAk;. ,sik fhyj;jpNyNa kdk; gf;Ftk; mile;jhy; tho;T ntw;wpahfTk; ,d;gkakhfTk; mikAk;.

kdpjtho;T kpfTk; GdpjkhdJ> Nkd;ikahdJ. tho;tpd; Nehf;fj;ijAk;> tho;f;ifj; jj;Jtj;ijAk; njhpe;Jf;nfhs;Sk;nghOJ ,jd; rpwg;ig czh;e;J nfhs;syhk;. vz;zq;fs; vt;thW Njhd;Wfpd;wd? mtw;iw vg;gb ey;yitahf khw;WtJ? Mirfisf; rPuikj;Jf; nfhz;L epiw kdNjhL tho;tJ vg;gb? rpdk; ,y;yhky; rfpg;Gj; jd;ikAld; tho KbANkh? vd;w Nfs;tpfSf;F tpiliaj; njhpe;Jf; nfhz;lhy; Fzeyj;jpy; cah;e;J thoyhk;.

ghuj ehL kdpj tsk; kpFe;jJ. kf;fspd; vz;zpf;ifNahL ey;y kdk; gilj;jth;fspd; vz;zpf;ifAk; mjpfkhFk;NghJ ,jd; Kd;Ndw;wk; gy klq;F cah;e;J tpsq;Fk;. jtwhd mZFKiw> Njhy;tpapy; KbAk;NghJ ftiyahf khWfpwJ. rhpahf jpl;lkpl;L tho;e;jhy; ftiy ,y;yhky; tho KbAk;. xt;nthW kdpjDk; gpwiu kjpj;J tho;j;jg; gofpdhy; ,dpikahd el;G cUthFk;> ey;y ez;gh;fs; fpilg;gJ xt;nthUtUf;Fk; ngUk; nrhj;jhf mikAk;. mq;Fjhd; rfpg;Gj;jd;ik> tpl;Lf;nfhLj;jy;> jpahfk; vd;gJ kyh;e;J kzk; tPRk;. ,e;j el;Gjhd; FLk;gj;jpYk;> rKjhaj;jpYk; mikjpia cUthf;fp kfpo;r;rpiag; ngUf;Fk;.

,d;iwa ,isQh;fs; tpQ;Qhd mwptpYk; gy;NtW JiwfspYk; kpFe;j Njh;r;rp ngw;W tpsq;Ffpwhh;fs;. mNjhL Nrh;e;J nghpath;fis kjpj;jy;> gzpe;J elj;jy;> ,aw;ifapd; xOq;fikg;ig Ghpe;Jnfhs;Sjy;> gpwh;f;Fj; Jd;gk; juhj tifapy; jdJ tho;f;if Kiwia mikj;Jf;nfhs;Sjy;> Jd;gg;gLk; kdpjh;fSf;F Xbr; nrd;W cjTjy; Nghd;wtw;wpYk; caUk;NghJjhd; kdpj rKjhak; gyk; ngw KbAk;. vy;NyhhplKk; md;Gk;> fUizAkhf elf;Fk; gf;Ftk; fpilf;Fk;. ,it vy;yhk; xUq;Nf fpilf;Fk; tifapy; ,e;j kdtsf;fiy Nahfh vd;w ghlj;jpl;lk; mikf;fg;gl;Ls;sJ. ,jidg; gbf;Fk; khzth;fs; fy;Y}hpfspy; xOf;fKk;> fz;zpaKk; ngw;W tho;thh;fs;. rKjhaj;jpy; cah;e;j gz;Gs;sth;fshfTk;> ey;y Fbkf;fshfTk; tho;thh;fs;.

VALUE EDUCATION
kdtsf;fiy Nahfh – Fwpg;G

1) NahfKk; cly;eyKk; (16 hours)

1.1 clyikg;G – 3 cly;fs; – Ie;jpy; msTKiw
1.2 vspaKiw clw;gapw;rp – ifg;gapw;rp – fhy; gapw;rp – %r;Rg;gapw;rp – fz; gapw;rp – fghygjp
1.3 kfuhrdk; 1-2 – cly; Nja;j;jy; – mf;Fgpu\h; gapw;rp – cly; jsh;j;jy;
1.4 Nahfrdq;fs; – gj;krhdk; – t[;uhrdk; – rf;fuhrdk; (gf;fthl;by;) – tpUr;rhrdk; – NfhfKj;uh – gr;rp Nkhj;jhrdk; – c];l;uhrdk; – tf;fuhrdk;– ryghrdk;

2) caph;tsKk; – kdtsKk; (16 hours)

2.1 ,sik fhj;jy; – KJikiaj; js;spg;NghLjy;
2.2 ghYzh;Tk; Md;kPfKk; – tpj;jpd; kfpik – ,y;yw tho;T – fw;Gnewp
2.3 kdjpd; gj;J gbepiyfs;
2.4 kd miyr;Roy; – kd xh;ikf;fhd gapw;rpfs;

3) Fzeyg;NgW (16 hours)

3.1 tho;tpd; Nehf;fk; – tho;f;ifj; jj;Jtk;
3.2 mfj;jha;T – vz;zk; – Muha;jy;
3.3 Mir rPuikj;jy;
3.4 rpdk; jtph;j;jy;

4) kdpjts Nkk;ghL (16 hours)

4.1 ftiy xopj;jy;
4.2 tho;j;Jk; gaDk;
4.3 el;G eyk;
4.4 jdpkdpj mikjp – cyf mikjp

5) ,aw;if epajp (16 hours)

5.1 xUq;fpizg;G Mw;wy; – nray;tpisTj; jj;Jtk;
5.2 kdj;J}a;ik> tpidj;J}a;ik – fUikAk;
5.3 md;Gk; fUizAk;
5.4 gz;ghl;Lf; fy;tp – Ie;njhOf;fg; gz;ghL

VALUE EDUCATION kdtsf;fiy Nahfh		
Units	**Title of the Paper**	**Hrs of Instruction**
Unit I NahfKk; cly;eyKk; (16 Hours)	1.1 clyikg;G	4 hours
	1.2 vspaKiw clw;gapw;rp	4 hours
	1.3 kfuhrdk;	4 hours
	1.4 Nahfhrdq;fs;	4 hours
Unit II caph;tsKk; kdtsKk; (16 hours)	2.1 ,sikf;fhj;jy;	4 hours
	2.2 ghYzh;Tk; Md;kPfKk;	4 hours
	2.3 kdjpd; 10 gbepiyfs;	4 hours
	2.4 kd miyr;Roy;	4 hours
Unit III Fzeyg;NgW (16 hours)	3.1 tho;tpd; Nehf;fk;	4 hours
	3.2 vz;zk; Muha;jy;	4 hours
	3.3 Mir rPuikj;jy;	4 hours
	3.4 rpdk; jtph;j;jy;	4 hours
Unit IV kdpjtsk; Nkk;ghL (16 hours)	4.1 ftiy xopj;jy;	4 hours
	4.2 tho;j;Jk; gaDk;	4 hours
	4.3 el;G eyk;	4 hours
	4.4 jdpkdpj mikjp	4 hours
Unit V ,aw;if epajp (16 hours)	5.1 nray;tpisTj; jj;Jtk;	4 hours
	5.2 kdj;J}a;ik> tpidj;J}a;ik	4 hours
	5.3 md;Gk; fUizAk;	4 hours
	5.4 gz;ghl;Lf; fy;tp	4 hours

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WOMEN'S STUDIES

II YEAR – IV SEMESTER
COURSE CODE: 7BWS4

COURSE – INTRODUCTION TO GENDER STUDIES

Objectives

- To gain knowledge on Gender Ideology
- To understand the concepts of HDI, GDI and GEM
- To know the Women Development Policies and Programmes

Unit I

Gender Identity: Gender Ideology – Sex Vs Gender – Biological Determinism – Dualism – Reductionism – Objectification – Socialization and Internalization

Unit II

Gender Roles: Division of Labour – Sex Role – Stereotypes – Gender Role – Work – Family and Gender – Motherhood – Production and Reproduction

Unit III

Gender Equality / Equity: Equality Vs Equity, HDI, GDI and GEM – Gender Inequality in Certain Vital Measures of Development: Sex Ration, Life Expectancy, Literacy Level – Work Participation – Decision Making and Political Participation

Unit IV

Strength of Women: Hormones and Chromosomes – Physical Differences – Record of the Fastest Men and Women in the World – Atthelets – Brain and Intelligence – Emotions.

Unit V

Development Policies and Programmes: WID – WAD – GAD – Approaches: Welfare – Anti-Poverty – Efficiency – Equity – Empowerment – Central and State Government Women Development Schemes.

Unit VI

Women Empowerment: Meaning and Concepts, Empowerment Levels – Framework – Empowerment Tools – Capability Approach

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PART V

II YEAR – III SEMESTER
COURSE CODE: 7BEA3

PART – V – EXTENSION ACTIVITIES

Extension Activities will be organized for 2 days in the Third Semester. The programme may be organized in any Saturday and Sunday.

A meeting of all the staff of the College (Teaching, Administrative and Technical Staff) be conducted before departing to the camp in which each and every aspect like Programmes to carried out, accommodation, food, medical aid, transport facilities, etc., should be thoroughly discussed.

One credit will be allotted for this Extension Activities. The marks allotted for each camp will be 100. Each student participating in the camp will be evaluated internally for 100 marks. The criteria for evaluation of Extension Activities will be as follows:

S. No.	Criteria	Maximum Marks
1.	Interaction with villagers	10
2.	Participation / Attitude towards work	10
3.	Participation in interaction and discussion	10
4.	Knowledge of problems / issues	10
5.	Organising & decision making ability	20
6.	Expression: a) Cultural programmes	10
	b) Report Writing	20
7.	Ability to adjust and work in a team	10
	Total	**100**

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ALAGAPPA UNIVERSITY, KARAIKUDI
NEW SYLLABUS FOR AFFILIATED COLLEGES
UNDER CBCS PATTERN WITH EFFECT FROM 2022-23 ONWARDS

B.Sc. COMPUTER SCIENCE
Programme Structure

Sem.	Part	Course Code	Courses	Title of the Course	T/P	Credits	Hours/ Week	Max. Marks		
								Int.	Ext.	Total
I	I	2211T	T/OL	Tamil/other languages – I	T	3	6	25	75	100
	II	712CE	E	Communicative English – I	T	3	6	25	75	100
	III	22BCE1C1	CC	Programming in C	T	5	5	25	75	100
		22BCE1P1	CC	Practical- Programming in C	P	4	4	40	60	100
		-	AL – IA	BCA/B.Sc., IT/Mathematics/ Electronics/ Software	T	3	3	25	75	100
		-	AL - IA	Practical-Respective Allied Theory Course	P	2	2	40	60	100
	IV	22BVE1	SEC - I	Value Education	T	2	2	25	75	100
				Library		-	2	-	-	-
				Total		**22**	**30**	**205**	**495**	**700**
II	I	2221T	T/OL	Tamil/other languages – II	T	3	6	25	75	100
	II	722CE	E	Communicative English – II	T	3	6	25	75	100
	III	22BCE2C1	CC	Object Oriented Programming with C++	T	5	5	25	75	100
		22BCE2P1	CC	Practical- Object Oriented Programming with C++	P	4	4	40	60	100
		-	AL – IA	BCA/B.Sc., IT/ Mathematics / Electronics/ Software	T	3	3	25	75	100
		-	AL - IA	Practical-Respective Allied Theory Course	P	2	2	40	60	100
	IV	22BES2	SEC - II	Environmental Studies	T	2	2	25	75	100
		Naan Mudhalvan Scheme		Language Proficiency for Employability(Effective English)	T	2	2	25	75	100
				Total		**24**	**30**	**235**	**570**	**800**
III	I	2231T	T/OL	Tamil/other languages – III	T	3	6	25	75	100
	II	2232E	E	English for Enrichment - I	T	3	6	25	75	100
	III	22BCE3C1	CC	Microprocessor and its applications	T	3	3	25	75	100
		22BCE3C2	CC	Data Structures and Computer Algorithms	T	3	3	25	75	100
		22BCE3P1	CC	Practical- Data Structures and Computer Algorithms	P	3	3	40	60	100
		-	AL – IA	BCA/B.Sc., IT/Mathematics/ Electronics/ Software	T	3	3	25	75	100
		-	AL - IA	Practical-Respective Allied Theory Course	P	2	2	40	60	100
	IV	22BE3	SEC-III	Entrepreneurship	T	2	2	25	75	100
		-	NME-I	1. Adipadai Tamil (or) 2. Advanced Tamil (or) 3. IT Skills for Employment (or) MOOC's	T	2	2	25	75	100
				Total		**24**	**30**	**255**	**645**	**900**
IV	I	2241T	T/OL	Tamil/other languages – IV	T	3	6	25	75	100
	II	2242E	E	English for Enrichment - II	T	3	3	25	75	100

	III	22BCE4C1	CC	Java Programming	T	4	4	25	75	100
		22BCE4C2	CC	Operating System	T	4	4	25	75	100
		22BCE4P1	CC	Practical – Java Programming	P	3	3	40	60	100
		-	AL – IA	BCA/B.Sc., IT/Mathematics/ Electronics/ Software	T	3	3	25	75	100
		-	AL - IA	Practical-Respective Allied Theory Course	P	2	2	40	60	100
	IV	-	NME-II	1. Adipadai Tamil (or) 2. Advanced Tamil (or) 3. Small Business Management (or) MOOC's	T	2	2	25	75	100
		Naan Mudhalvan Scheme		Digital Skills for Employability – (Microsoft-Office Fundamentals)	T	2	3	25	75	100
				Total		**26**	**30**	**255**	**645**	**900**
V	III	22BCE5C1	CC	Relational Database Management Systems	T	4	4	25	75	100
		22BCE5C2	CC	Python Programming	T	4	4	25	75	100
		22BCE5C3	CC	Software Engineering	T	4	4	25	75	100
		22BCE5C4	CC	Computer Graphics	T	4	4	25	75	100
		22BCE5P1	CC	Practical- Relational Database Management Systems Lab	P	4	6	40	60	100
		22BCE5P2	CC	Practical – Python Programming	P	4	6	40	60	100
				Career Development/ Employability Skills		-	2	-	-	-
				Total		**24**	**30**	**180**	**420**	**600**
		22BCE6I	DSE	Internship		24	26	150	250	400
		Naan Mudhalvan Scheme		Emerging Technology for Employability(Course Name: Machine Learning*/Android app**/ Cyber Security**)	T	2	4	25	75	100
				Total		**26**	**30**	**175**	**325**	**500**
				Or						
VI	III	22BCE6E1/ 22BCE6E2	DSE	Computer Networks/ Network Security	T	6	6	25	75	100
		22BCE6E3/ 22BCE6E4		Mobile Computing / Data Mining and Data Warehousing	T	6	6	25	75	100
		22BCE6E5/ 22BCE6E6		.Net Technologies / Embedded Systems	T	6	6	25	75	100
		22BCE6E7/ 22BCE6E8		Internet of things / Cloud Computing	T	6	6	40	60	100
		others		Library/ Yoga etc.,		-	2	-	-	-
	III	Naan Mudhalvan Scheme		Emerging Technology for Employability(Course Name: Machine Learning*/Android app**/ Cyber Security***)	T	2	4	25	75	100
				Total		**26**	**30**	**125**	**375**	**500**
				Or						
VI	III	22BCE6PR	DSE	Project**		6	8	25	75	100
		22BCE6E1/ 22BCE6E2		Computer Networks/ Network Security	T	6	6	25	75	100
		22BCE6E3/ 22BCE6E4		Mobile Computing / Data Mining and Data Warehousing	T	6	6	25	75	100
		22BCE6E5/ 22BCE6E6		.Net Technologies / Embedded Systems	T	6	6	25	75	100

		Naan Mudhalvan Scheme		Emerging Technology for Employability(Course Name: Machine Learning*/Android app**/ Cyber Security***)	T	2	4	25	75	100
				Total		**26**	**30**	**125**	**375**	**500**
				Grand Total		**146**	**-**	**-**	**-**	**4400**

(Note: ** Students are recommended to visit IT Park / IT Based Sectors / IT Companies)

*Machine Learning - Government Colleges
** Android App - Government Aided College
***Cyber Security - Self financing College

Sem.	Part	Course Code	Title of the Paper	Credit	Hours/ Week	Marks		
						Int.	Ext.	Total
I	III	71BEPP- I	Professional English for Physical Science -I	4	5	25	75	100
II		72BEPP - II	Professional English for Physical Science –II	4	5	25	75	100
III		*	Professional English for Physical Science –III	4	5	25	75	100
IV			Professional English for Physical Science –IV	4	5	25	75	100

*The Syllabus of Professional English for III & IV Semester will be provided after Receiving the syllabus from TANSCHE.

As per TANSCHE, the Professional English book will be taught to all four streams apart from the existing hours of teaching/additional hours of teaching (1hour/day) as a 4 credit paper as an add on course on par with Major paper and completion of the paper is a must to continue his/her studies further.

- TOL-Tamil/Other Languages,
- E – English
- CC-Core course –Core competency, critical thinking, analytical reasoning, research skill & teamwork
- Allied -Exposure beyond the discipline
- AECC- -Ability Enhancement Compulsory Course (Professional English & Environmental Studies) - Additional academic knowledge, psychology and problem solving etc.,
- SEC-Skill Enhancement Course - Exposure beyond the discipline (Value Education , Entrepreneurship Course, Computer application for Science, etc.,
- NME -Non Major Elective – Exposure beyond the discipline
- DSE – Discipline specific elective – -Student choice – either or
  - Internship
  - If internship – Marks = Internal =150 (75+75) two midterm evaluation through Viva voce and External 250 marks (Report =150 +Viva Voce=100) =Total 400 marks
  - Theory papers or
  - Project + 3 theory papers.
- MOOCs – Massive Open Online Courses

* T- Theory, P- Practical

Practical Subjects:
The following list of parameters taken into account for the evaluation of practical examination. *Total Marks: 100 (Internal: 40 marks, External: 60 Marks)*

Parameters:
For Internal Marks:

i. Internal test: 20
ii. Record Work: 20

Total: 40

For External Marks:

i.	Aim, Procedure / Algorithm and Program:	15
ii.	Coding and Compilation:	15
iii.	Debugging:	15
iv.	Results:	15
	Total:	**60**

For Project Work:

1. The students will be allowed to work on any project based on the concepts studied in core/elective courses.
2. The project work should be compulsorily done in the college only under the supervision of the department staffs.
3. The combined project shall be undertaken by the students as a team of two.
4. The number of teams should be equally assigned to existing Staff members.
5. The following list of parameters taken into account for the evaluation of Project work and Viva-voce.
   Total Marks: 100 (Internal: 40 marks, External: 60 Marks)

Parameters:

For Internal Marks: Two review meetings: 2 × 15 = 30 Marks
Overall Performance: = 10 Marks

For External Marks: Project Report: 20 Marks
Project demo &Presentation: 20 Marks
Viva-Voce: 20 Marks

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Semester - I				
Course Code: 22BCE1C1	**Core Course - I**	**T/P**	**C**	**H/W**
	PROGRAMMING IN C	**T**	**5**	**5**

Objectives	• To give basic understanding of C Language. • To enable students to develop Program for real world Problems.
Unit - I	**Overview of C:** History of C – Importance of C – Basic Structure of C Programs – Programming Style – Character Set – C Tokens – Keywords and Identifiers – Constants, Variables and Data Types – Declaration of Variables – Defining Symbolic Constants – Declaring a variable as a constant – overflow and underflow of data – **Operators and Expressions:** Arithmetic, relational, logical, assignment operators – increment and decrement operators, conditional operators, bitwise operators, special operators – Arithmetic Expressions- Evaluation of Expressions – Precedence of Arithmetic Operators – Type Conversions in Expressions – Operator Precedence and Associativity Mathematical functions.
Unit - II	**Managing I/O Operations:** Reading and Writing a Character – Formatted Input, Output – **Decision Making & Branching:** if statement - if else statement - nesting of if else statements - else if ladder – switch statement – the ?: operator – goto statement – the while statement – do statement – the for statement – jumps in loops.
Unit - III	**Arrays:** One-Dimensional Arrays – Declaration, Initialization – Two-Dimensional Arrays – Multi-dimensional Arrays – Dynamic Arrays – Initialization. **Strings:** Declaration, Initialization of string variables – reading and writing strings – string handling functions
Unit - IV	**User-defined functions:** need – multi-function programs – elements of user defined functions – definition – return values and their types – function calls, declaration, category – all types of arguments and return values – nesting of functions – recursion – passing arrays, strings to functions – scope visibility and life time of variables. **Structures and Unions:** Defining a structure – declaring a structure variable – accessing structure members – initialization – copying and comparing – operation on individual members – array of structures – arrays within structures – structures within structures – structures and functions –unions – size of structures – bit fields.
Unit - V	**Pointers:** the address of a variable – declaring, initialization of pointer variables – accessing a variable through its pointer – chain of pointers – pointer increments and scale factors – pointers and character strings – pointers as function arguments – pointers and structures. **Files**: Defining, opening, closing a file – IO Operations on files – Error handling during IO operations – command line arguments.

Text Book:

E.Balagurusamy , 2012*, Programming in ANSI C*, , 6th Edition, Tata McGraw Hill Publishing Company.

UNIT I: Chapters 1 (Except 1.3-1.7, 1.10-1.12), 2 (Except 2.9, 2.13), 3 (Except 3.13)

UNIT II: Chapters 4 – 6

UNIT III: Chapters 7, 8 (Except 8.5, 8.6, 8.7, 8.9, 8.10)

UNIT IV: Chapters 9 (Except 9.20), 10

UNIT V: Chapters 11 (Except 11.8, 11.10, 11.12, 11.14, 11.15, 11.17), 12 (Except 12.6)

Books for Reference:

Ashok N.Kamthane , 2006 *Programming with ANSI and Turbo C* ,Pearson Education

Kanetkar Y., 1999.*Let us C,* BPB Pub., New Delhi, H. Schildt, C 2000: *The Complete Reference*, 4th Edition, TMH Edition, Schaum's Outline Series, Gottfried, Tata McGraw Hill, 2006 *Programming with C*,	
Outcomes	• Students gain knowledge to develop C Programs. • Students were able to apply and implement programs for solving real world problems.

Semester - I				
Course Code: 22BCE1P1	**Core Practical - I**	**T/P**	**C**	**H/W**
	PROGRAMMING IN C LAB	**P**	**4**	**4**

Objectives	• To Understand the C Language Practically • To know how to solve the real-time problems.
Group- A	1. Write a C Program to find the sum of digits. 2. Write a C Program to check whether a given number is Armstrong or not. 3. Write a C Program to check whether a given number is Prime or not. 4. Write a C Program to generate the Fibonacci series. 5. Write a C Program to display the given number is Adam number or not. 6. Write a C Program to print reverse of the given number and string. 7. Write a C Program to find minimum and maximum of 'n' numbers using array. 8. Write a C Program to arrange the given number in ascending order. 9. Write a C Program to add and multiply two matrices. 10. Write a C Program to calculate NCR and NPR.
Group- B	1. Write a C Program to find the grade of a student using else if ladder. 2. Write a C Program to implement the various string handling function. 3. Write a C Program to create an integer file and displaying the even numbers only. 4. Write a C Program to calculate quadratic equation using switch-case. 5. Write a C Program to count number of characters, words and lines in a text file. 6. Write a C Program to generate student mark list using array of structures. 7. Write a C Program to create and process the student mark list using file 8. Write a C Program to create and process pay bill using file 9. Write a C Program to create and process inventory control using file 10. Write a C Program to create and process electricity bill using file

Note:

One Question from Group A and another one Question from Group B is compulsory for University Examination

Outcomes	• Students were able to relate the ways to solve simple programs. • Students were able to understand and trace the execution of Programs using Arrays, Structures and files.

Semester - II				
Course code: 22BCE2C1	**Core Course -II**	**T/P**	**C**	**H/W**
	OBJECT ORIENTED PROGRAMMING WITH C++	**T**	**5**	**5**

Objectives	• To understand the basic concepts of OOPS • To enable Students develop programs for real-time entities.
Unit -I	Software Crisis – Software Evolution – Basic Concepts of Object-Oriented Programming – Benefits of OOP – Object-Oriented Languages - Applications of OOP – Application of C++ - Structure of a C++ Program – Tokens – Keywords – Identifiers – 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++ - Manipulators – Type cast operator – Expressions and their types-Implicit conversions – Control structures – The main function – Function prototyping – inline functions – Function overloading.
Unit-II	Specifying a class – Defining member functions – Making an outside function inline – Nesting of member functions – Private member functions – Array within a class – Memory allocation for objects – Static data members – Static member functions – Array of objects - Objects as function arguments – Friendly functions – Returning objects – Constant member functions – Constructors – Parameterized constructor – Multiple constructors in a class – Constructors with default arguments – Dynamic initialization of objects – Copy constructor – Destructors.
Unit -III	Defining operator overloading – Overloading unary operators – Overloading binary operators – Overloading binary operators using friend function – Rules for overloading operators - Defining derived classes – Single inheritance – Making a private member inheritable – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance - Virtual base classes – Constructors in derived class – Member classes: Nesting of classes.
Unit -IV	Pointer to objects – this pointer – Pointers to derived classes – Virtual functions – Pure virtual functions – C++ Stream classes – Unformatted I/O operations – Managing output with manipulators.
Unit -V	Classes of file stream operations – Opening and Closing files – Detecting end of file – More about open() function – File modes, File pointers and their manipulation – Sequential input and output operations – Command-line arguments- Templates: class templates and function templates.

Text Book:

Object Oriented Programming with C++, E. Balagurusamy, Sixth Edition-2013, McGraw Hill Education (India) Private Limited, New Delhi.

UNIT I – Chapter 1 (Except 1.3, 1.4),
Chapter 2 (Only 2.6),
Chapter 3 (Except 3.20, 3.21, 3.22), Chapter 4
UNIT II – Chapter 5 (Except 5.18, 5.19), Chapter 6 (Except 6.8, 6.9, 6.10)
UNIT III – Chapter 7, Chapter 8
UNIT IV – Chapter 9, Chapter 10
UNIT V – Chapter 11 (Except 11.8), Chapter 12 (Only 12.2, 12.3 and 12.4)

Books for Reference:

C++ - The Complete Reference, Herbert Schildt, TMH, 1998.

C++ How to Program, Paul Deitel, Harvey Deitel, PHI, Ninth edition (2014).

Ashok N.Kamthane, Object Oriented Programming with ANSI & Turbo C ++, Pearson Education, 2006.

Object-Oriented Programming With C++, Poornachandra Sarang, 2nd Edition, PHI Learning Private Limited, New Delhi, 2009. Object-Oriented Programming Using C++, Alok Kumar Jagadev, Amiya Kumar Rath And Satchidananda Dehuri, Prentice-Hall of India Private Limited, New Delhi, 2007.	
Outcomes	• Students gain knowledge to develop Object Oriented Programs. • Using the OOPS Concepts Students were able to solve real-time problems.

Semester - II				
Course code: 22BCE2P1	**Core Practical-II**	**T/P**	**C**	**H/W**
	OBJECT ORIENTED PROGRAMMING WITH C++ LAB	**P**	**4**	**4**

Objectives	• To Understand the OOPS Concept Practically. • To know how to solve the real-time problems using OOPS.
Group- A	1. Printing Prime numbers between two given numbers. 2. Printing 3 digit numbers as a series of words. (Ex. 543 should be printed out as Five Four Three). 3. Finding area of geometric shapes using function overloading. 4. Inline functions for simple arithmetic operations. 5. Demonstrating the use of Pre-defined Manipulators. 6. Demonstrating the use of friend function. 7. Creating student mark list using array of objects, 8. Demonstrating constructor overloading. 9. Overloading the unary – operator. 10. Demonstrating single inheritance. 11. Demonstrating the use of "this" pointer. 12. Designing our own manipulator. 13. Illustrating function templates. 14. Illustrating class templates.
Group- B	1. Overloading the binary + operator. 2. Demonstrating Multiple inheritance. 3. Demonstrating Multilevel inheritance. 4. Demonstrating Hierarchical inheritance. 5. Demonstrating Virtual functions. 6. Processing mark list using binary file. 7. Count number of objects in a file. 8. Demonstrating the use of Command-line arguments.

Note:
One Question from Group A and another one Question from Group B is compulsory for University Examination

Outcomes	• Students were able to understand the concept of OOPS. • Students were able to understand and trace the execution of Programs using OOPS Concept.

Semester - III				
Course code: 22BCE3C1	**Core Course -III**	**T/P**	**C**	**H/W**
	Microprocessor and its applications	**T**	**3**	**3**

Objectives	➢ To gain knowledge about the Microprocessor ➢ To understand the basics of 8086 processor ➢ To gain insight about the ARM processor and programming in ARM Assembly Language
Unit -I	**The 8086 Microprocessor** Introduction to 8086 – Microprocessor architecture – Addressing modes - Instruction set and assembler directives – Assembly language programming – Modular Programming - Linking and Relocation - Stacks - Procedures – Macros – Interrupts and interrupt service routines – byte and String Manipulation.
Unit-II	**8086 System Bus Structure** 8086 signals – Basic configurations – System bus timing –System design using 8086 – IO programming – Introduction to Multiprogramming – System Bus Structure Multiprocessor configurations – Coprocessor, closely coupled and loosely Coupled configurations – Introduction to advanced processors.
Unit -III	**I/O Interfacing** Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications Case studies: Traffic Light control, LED display, LCD display, Keyboard display interface and Alarm Controller.
Unit -IV	**Introduction to Processor Design** Processor architecture and organization - Abstraction in hardware design - MU0 - a simple processor - Instruction set design - Processor design trade-offs - The Reduced Instruction Set Computer - Design for low power consumption - The ARM Architecture
Unit -V	**ARM Assembly Language Programming** Data processing instructions - Data transfer instructions - Control flow instructions - Writing simple assembly language programs - ARM Organization and Implementation

Reference and Textbooks:-

Text Books:

Liu, Y. C., & Gibson, G. A. (2007). *Microcomputer systems: The 8086/8088 family: Architecture, programming, and design*. Prentice-Hall, Inc.

Furber, S. B. (2000). *ARM system-on-chip architecture*. pearson Education.

Book for Reference:

Hall, D. V. (2012). *Microprocessors and interfacing: programming and hardware*. McGraw-Hill, Inc.

Mishra, S., Singh, N. K., & Rousseau, V. (2015). *System on chip interfaces for low power design*. Morgan Kaufmann.

Outcomes	➢ The students gain knowledge about Microprocessor and its applications ➢ The students will be able to understand the working of 8086 processor ➢ The students will gain insight ARM processor design and programming.

Semester - III				
Course code: 22BCE3C2	**Core Course-IV**	**T/P**	**C**	**H/W**
	DATA STRUCTURES AND COMPUTER ALGORITHMS	**T**	**3**	**3**

Objectives	• To acquire knowledge about various Data Structures and Algorithms. • To find suitable Data Structure and Computer Algorithms for real world problems.
Unit -I	**Arrays**: Axiomatization – Ordered Lists – Sparse Matrices – Representation of Arrays - **Stacks and Queues**: Fundamentals – Evaluation of Expressions – Multiple Stacks and Queues
Unit-II	**Linked Lists**: Singly Linked Lists – Linked Stack and Queues – Polynomial Addition – Doubly Linked List and Storage Management – **Trees**: Basic Terminologies – Binary Trees – Binary Tree Traversal – Threaded Binary Tree – Binary Tree Representation.
Unit -III	**Elementary Data Structures:** Dictionaries – Priority Queues – Sets and Disjoint Set Union – Graphs.
Unit -IV	**Algorithms:** Introduction: Algorithm Specification – Performance Analysis – Divide and Conquer: General method – Binary Search – Finding the maximum and minimum – Merge Sort – Quick Sort – Selection – Strassen's Matrix Multiplication.
Unit -V	**The Greedy Method:** General Method – Knapsack problem – Job Sequencing with deadlines – Optimal Storage on tapes – Optimal merge patterns Minimum cost spanning trees - **Dynamic Programming**: All pairs of shortest path – single source shortest path - Travelling salesman problem. **Basic Traversal and Search Techniques**: Techniques For Graphs.

Text Book:

"*Fundamentals of Data Structures*", Ellis Horowitz, Sartaj Sahni, Galgotia Publications.

Unit – I – Chapter 2, Chapter 3(Except 3.2)

Unit – II – Chapter 4 (Except 4.3, 4.5, 4.6, 4.7), Chapter 5 (Except 5.5, 5.8, 5.9)

Fundamentals of Computer Algorithms, Ellis Horowitz, Sarataj Sahni, Galgotia Publications Pvt. Ltd, New Delhi

Unit III – Chapter 2 (Except 2.1, 2.2)

UNIT IV – Chapter 1 (Except 1.4), Chapter 3 (Except 3.2, 3.9)

UNIT V – Chapter 4 (Except 4.2, 4.6.3, 4.9) , Chapter 5 (Only 5.3, 5.4, 5.9), Chapter 6.2

Outcomes	• Students will be able to apply the Data Structures and Algorithms to solve simple problems. • Students were able to compare various techniques used in Data structures and Algorithms by developing real world applications.

Semester - III				
Course code: 22BCE3P1	**Core Practical-III**	**T/P**	**C**	**H/W**
	DATA STRUCTURES AND COMPUTER ALGORITHMS LAB (USING C AND C++)	**P**	**3**	**3**

Objectives	• To Understand the Data Structures and Computer Algorithms concept. • To know how to use the Data Structures and Computer Algorithms for real world problems.
Group- A	**(Programs from Data Structures Using C)** 1. Implementing Stack as an array. 2. Implementing Stack as a linked list. 3. Convert Infix expression to Postfix expression using stack. 4. Convert Infix expression to Prefix expression using Stack. 5. Implementing Queue as an Array. 6. Implement Queue as a linked list. 7. Binary tree traversals. 8. Implement Binary Search Tree.
Group- B	**(Programs from Computer Algorithms Using C++)** 1. Linear Search 2. Binary Search 3. Bubble Sort 4. Insertion Sort 5. Merge Sort 6. Quick Sort 7. Selection Sort 8. Minimum Spanning Tree

Note:

One Question from Group A and another one Question from Group B is compulsory for University Examination

Outcomes	• Students were able to understand the concept of Data Structures and Computer Algorithms. • Students were able to compare various techniques by executing the programs using Data Structures and Computer Algorithms.

Semester - IV				
Course code: 22BCE4C1	**Core Course -V**	**T/P**	**C**	**H/W**
	JAVA PROGRAMMING	**T**	**4**	**4**

Objectives	• To gain knowledge about basic concepts of Java. • To engage students to build programs using Java methodology.
Unit -I	**Java Evolution:** Java History – Java Features – Java and Internet – World Wide Web – Web Browsers – H/W and S/W requirements – Java Support Systems – Java Environment. **Overview of Java language:** Introduction – Simple Java Program –Comments – Java Program Structure –Tokens – Java Statements – Implementing a Java Program – JVM – Command Line Arguments. Constants – Variables – Data Types – Type Casting.
Unit-II	**Operators and Expressions:** Arithmetic Operators – Relational, Logical, Assignment, Increment and Decrement, Conditional, Bitwise, Special Operators – Arithmetic expressions, Evaluation of expression – Precedence of Arithmetic Operators – Type Conversions – Operator Precedence and associativity – Mathematical Functions. **Decision Making and Branching:** If – if…..else – Nesting of if……. Else – else if – switch - ? Operator. **Decision Making and Looping:** While – do – for – jump in loops – labeled loops.
Unit -III	**Classes, Objects and Methods:** Defining a class – Adding variables, methods – Creating objects – Accessing Class Members– Constructors – Methods overloading – static members – Nesting of Methods – Inheritance – Overriding methods – final Variables and methods – Final classes – finalizer methods – Abstract methods and classes – visibility control. **Arrays, Strings and Vectors:** Arrays – One Dimensional Arrays – Creating an array – Two Dimensional Arrays – Strings – Vectors – Wrapper Classes **Interfaces: Multiple Inheritance** Defining interfaces – Extending interfaces – implementing interfaces – Accessing interface variables.
Unit -IV	**Packages:** Java API Packages – Using system packages – Naming conventions – Creating Packages – Accessing a Package – Using a Package – Adding a Class to a Package – hiding classes. **Multithreaded Programming:** Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread – Using Thread methods – Thread Exceptions – Thread Priority – Synchronization – Implementing the 'Runnable' Interface. **Managing Errors and Exceptions:** Types of errors – Exceptions – Syntax of Exception handling code – Multiple Catch Statements – Using finally statement – Throwing our own Exceptions – Using Exceptions for Debugging.
Unit -V	**Applet Programming:** How applets differ from Applications – preparing to write applets – Building Applet Code – Applet life cycle – creating an Executable Applet – Designing a Web Page – Applet Tag – Adding Applet to HTML file – Running the Applet – Passing parameters to Applets – Displaying Numerical values – Getting input from the user **Graphics Programming:** The Graphics Class – Lines and Rectangles – Circles and Ellipses – Drawing Arcs – Drawing Polygons – Line Graphs – Using Control Loops in Applets – Drawing Bar Charts.

Text Book:

Programming with java, E.Balagurusamy TMH, 4th Edition.

Books for Reference:

Java 2- The Complete Reference, Herbert Schildt , 5th Edition(2002) , McGraw Hill Education (India) Private Limited.

Programming with Java (Schaum's Outline Series), John R.Hubbard, 2nd Edition(2004), McGraw-Hill International Editions. *Programming in Java2,* By Dr.K.Somasundaram, Publisher : First Edition JAICO Publishing House, 2008.	
Outcomes	• Students will able to understand the Java programming concepts. • Students will able to apply concepts and methods for real-time problems.

Semester - IV				
Course code: 22BCE4C2	**Core Course-VI**	**T/P**	**C**	**H/W**
	OPERATING SYSTEM	**T**	**4**	**4**

Objectives	• To understand the services provided by and the design of an operating system. • To understand the structure and organization of the file system.
Unit -I	**Introduction**: Operating Systems - Computer-System Organization - Computer-System Architecture - Operating-System Structure - Operating-System Operations - Process Management - Memory Management - Storage Management - Protection and Security - **Operating-System Structures** : Operating-System Services : User and Operating-System Interface - System Calls - Types of System Calls - System Programs
Unit-II	**Processes**: Process Concept - Process Scheduling - Operations on Processes - Interprocess Communication - **Process Synchronization** : Background - The Critical-Section Problem - Peterson's Solution - Synchronization Hardware - Mutex Locks - Semaphores - Classic Problems of Synchronization – Monitors.
Unit -III	**CPU Scheduling** : Basic Concepts - Scheduling Criteria - Scheduling Algorithms - Thread Scheduling - Multiple-Processor Scheduling - Real-Time CPU Scheduling - **Deadlocks**: System Model - Deadlock Characterization - Methods for Handling Deadlocks - Deadlock Prevention - Deadlock Avoidance - Deadlock Detection - Recovery from Deadlock
Unit -IV	**Main Memory** : Background - Swapping - Contiguous Memory Allocation - Segmentation - Paging - Structure of the Page Table - **Virtual Memory**: Background - Demand Paging - Copy-on-Write - Page Replacement - Allocation of Frames - Thrashing - Memory-Mapped Files - Allocating Kernel Memory
Unit -V	**Mass-Storage Structure**: Overview of Mass-Storage - Structure - Disk Structure - Disk Attachment - Disk Scheduling - Disk Management - Swap-Space Management - RAID Structure - Stable-Storage Implementation - **File-System Implementation**: File-System Structure - File-System Implementation - Directory Implementation - Allocation Methods - Free-Space Management - Efficiency and Performance – Recovery

Text Book:

"***Operating System Concepts***", Abraham Silberschatz, Peter Baer Galvin,Greg Gagne, Ninth Edition, John Wiley & Sons, Inc

Outcomes	• Understands the different services provided by Operating System at different level. • They learn real life applications of Operating System in every field.

Semester - IV				
Course code: 22BCE4P1	**Core Practical-IV**	**T/P**	**C**	**H/W**
	JAVA PROGRAMMING LAB	**P**	**3**	**3**

Objectives

- To Understand the Java Concept Practically.
- To write programs for solving real world problems using Java collection framework.

Group- A

1. Applet Program to Displaying Digital Clock. (Ex: 09:15:45 AM)
2. Applet Program to Draw our National Flag.
3. Applet Program to Draw Bar Charts with different colors.
4. Applet Program to draw Building with attractive colors.
5. Applet Program to addition and multiplication of two numbers
6. Write applets to draw the following Shapes:
7. **(a).** Cone **(b).** Cylinder **(c).** Square inside a Circle **(d).** Circle inside a Square
8. Write an applet Program to design a simple calculator.
9. Write an Applet Program to animate a ball across the Screen.

Group- B

1. To perform addition and subtraction of complex numbers using class and objects.
2. Program to calculate area of Square and Rectangle using Method Overloading.
3. Program to implement User-Defined Exception (minimum 3 types of exception should be used).
4. Create two threads such that one of the thread generate Fibonacci series and another generate perfect numbers between two given limits.
5. Using command line arguments, test if the given string is palindrome or not.
6. Program to perform Matrix Addition and Multiplication using class.
7. Program to perform the String operations. (Reverse, Copy, Concatenate, Compare)
8. Program to display student mark details using Single Inheritance.
9. Using multilevel inheritance process student marks.
10. Implement multiple inheritance for payroll processing.
11. Program to implement banking transaction using Interface.
12. Program to implement Multiple Thread.
13. Program to implement Package.

Note:

One Question from Group A and another one Question from Group B is compulsory for University Examination

Outcomes

- Students were able to solve real world problems using Java collection framework.
- Students were able to write and execute programs using various methods and concepts.

Semester - V				
Course code: 22BCE5C1	**Core Course -VII**	**T/P**	**C**	**H/W**
	RELATIONAL DATABASE MANGEMENT SYSTEMS	**T**	**4**	**4**

Objectives	• To impart knowledge about various databases and deep knowledge in RDBMS. • To utilize the wide range of futures available in DBMS package.
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 – Database Users and Administrators– Transaction Management – Database users and Architectures – History of Database System. **Entity-Relationship Model**: E-R model – constraints – E-R diagrams – E-R design issues – weak entity sets – Extended E-R features.
Unit-II	**Relational Database Design: Features of good** Relational designs – Atomic domains and First Normal Form – Decomposition using functional dependencies – Functional dependency theory – Decomposition using functional – Decomposition using multivalued dependencies – more Normal forms – database design process – modeling temporal data
Unit -III	**Database System Architecture:** Centralized and Client-Server architecture – Server system architecture – parallel systems – Distributed systems – Network types. Parallel databases: I/O parallelism – Interquery Parallelism – Intraquery parallelism. Distributed Databases: Homogeneous and Heterogeneous databases – Distributed Data storage – Distributed transactions – Distributed query processing.
Unit -IV	**Schema Objects** Data Integrity – Creating and Maintaining Tables – Indexes – Sequences – Views – Users Privileges and Roles –Synonyms.
Unit -V	**PL/SQL:** PL/SQL – Triggers – Stored Procedures and Functions – Package – Cursors – Transaction.

Text Books:

Silberschatz Korth Sudarshan, 2006,*Database System Concepts* –International (5th Edition) McGraw Hill Higher Education

Jose A.Ramalho – Learn ORACLE 8i BPB Publications 2003

Books for Reference:

"Oracle 9i The complete reference", Kevin Loney and George Koch, Tata McGraw Hill, 2004.

"Database Management Systems", Ramakrishnan and Gehrke, Mc Graw Hill, Third Edition, 2003.

"Oracle 9i PL/SQL Programming "Scott Urman, Oracle Press, Tata Mc Graw Hill, 2002.

Outcomes	• Students acquire knowledge about RDBMS and ER models. • Students were able to find suitable PL/SQL routines to solve database related problems.

Semester - V				
Course code: 22BCE5C2	**Core Course -VIII**	**T/P**	**C**	**H/W**
	PYTHON PROGRAMMING	**T**	**4**	**4**

Objectives	• To acquire programming skills and Object Oriented Skills in Python • To develop the skill of designing Graphical user Interfaces and ability to write database applications in Python
Unit -I	Python Programming Introduction: IDLE – Python Strings – Relational Operators – Logical Operators – Bitwise Operators – Variables and Assignment Statements – Keywords – Script Mode – **Functions:** Built-In Functions – Function Definition and Call – Import User-defined Module – Assert statement – Command Line Arguments.
Unit-II	**Control Structures:** IF Conditional Statement – Iteration – break – continue – pass statements – else statement - **Scope:** Objects and Object ids – Scope of Objects and Names – **Strings:** String Functions – Slicing – Membership – Built-in Functions – pattern matching.
Unit -III	**Mutable and Immutable Objects:** Lists – Sets – Tuples – Dictionary - Files and **Exceptions:** File Handling – Writing structures to a File – Errors and Exceptions – Handling Exception
Unit -IV	**Classes I** : Classes and Objects – Class as Abstract Data type – Date Class – **Classes II**: Polymorphism – Encapsulation – modifier and Accessor Methods – Static Method – Adding Methods Dynamically – Composition – Inheritance – Built-in Functions for Classes
Unit -V	**Graphics:** 2D Graphics – 3D Objects – Animation – **Applications of Python:** Sharing Data using Sockets – Managing Databases using SQL – Integrating Java with Python

Text Book:

Sheetal Taneja, Naveen Kumar, *Python Programming A Modular Approach*, Pearson India Education Services Pvt. Ltd.

Outcomes	• Students will able to define and demonstrate the use of built-in data structures "lists" and "dictionary". • Students will able to design and implement a program to solve a real world problem and as well as to Design and implement GUI application.

Semester - V				
Course code 22BCE5C3	**Core Course-IX**	**T/P**	**C**	**H/W**
	SOFTWARE ENGINEERING	**T**	**4**	**4**

Objectives	• To equip students with the knowledge and techniques of professional practices in software processes and activities. • To acquire knowledge about developing a project.
Unit -I	**Introduction:** Introduction to software engineering – some definitions – some size factors –quality and productivity factors – managerial issues Planning a software project: Defining the problem– developing a solution strategy – planning the development process – planning an organizational structure – other planning activities.
Unit-II	**Software Cost Estimation:** software cost factors – software cost estimation techniques – estimating software maintenance costs **Software Requirements Definition:** The software requirements specification – formal specification techniques.
Unit -III	**Software Design:** Fundamental design concepts – modules and modularization criteria – design notations – design techniques – Stepwise refinement – Integrated top down development – Jackson Structured Programming -detailed design considerations –test plan – milestones, walkthroughs and inspections – design guidelines
Unit -IV	**Software Implementation:** Structured coding techniques – coding style – standards and guidelines - Verification and validation techniques – Quality Assurance – Walkthrough and inspection -Unit Testing and Debugging – System Testing
Unit -V	**Software Maintenance:** Enhancing maintainability during development – managerial aspects of software engineering – configuration management – source code metrics – other maintenance tools and techniques.

Text Book:

Software Engineering Concepts – Richard E. Fairley, Tata McGraw Hill Publishing Company Ltd, New Delhi

Books for Reference:

Software Engineering – A Practitioner's approach – Roger S. Pressman, (Fourth Edition) McGrawHill International Editions.

An Integrated Approach to Software engineering – Pankaj Jalote, Second Edition Narosa Publishing House

Fundamentals of Software Engineering, CarloGhezzi, Mehdi Jazayeri, Dino Mandrioli, Prentice Hall of India Pvt. Ltd.,New Delhi.

Outcomes	• Students will gain knowledge about analysis and design a project. • Students will able to develop a simple projects and testing reports.

Semester - V				
Course code: 22BCE5C4	**Core Course-X**	**T/P**	**C**	**H/W**
	COMPUTER GRAPHICS	**T**	**4**	**4**

Objectives	• To understand the concept of Graphics and their application in various areas. • To understand the concept of transformation and viewing techniques in detail.
Unit -I	**A survey of computer graphics:** Computer-Aided Design - Presentation Graphics – Computer Art – Entertainment – Education and Training – Visualization – Image Processing – Graphical User Interfaces. Overview of Graphics Systems: Video Display Devices – Raster Scan Systems – Random Scan Systems – Input Devices – Hard Copy Devices.
Unit-II	**Output Primitives:** Points and Lines – Line Drawing Algorithms – Circle Generating Algorithms – Ellipse Generating Algorithms – Filled Area primitives.
Unit -III	**Attributes of Output Primitives:** Line Attributes – Curve Attributes – Color and Gray Scale Levels – Area Fill Attributes – Character Attributes – Bundled Attributes – Inquiry Functions – Antialiasing.
Unit -IV	**Two–Dimensional Geometric Transformations:** Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations – Transformations between Coordinate Systems.
Unit -V	**Two –Dimensional Viewing :** The Viewing Pipeline – Viewing Coordinate Reference Frame – Window –to- Viewport Coordinate Transformation – Two-Dimensional Viewing Functions – Clipping Operations – Point Clipping – Line Clipping – Polygon Clipping – Curve Clipping – Text Clipping – Exterior Clipping.

Text Books:

Computer Graphics, Donald Hearn and M. Pauline Baker, Prentice Hall Of India Pvt. Ltd., New Delhi, Second Edition, 1994.

Unit I : Chapters 1.1 – 1.8, 2. 1-2.3, 2.5, 2.6
Unit II : Chapters 3.1, 3.2, 3.5-3.7, 3.11
Unit III : Chapters 4.1 – 4.8
Unit IV : Chapters 5.1 – 5.5
Unit V : Chapters 6.1 – 6.11

Reference Books:

Computer Graphics, Multimedia and Animation – Malay K. Pakhira, Prentice Hall Of India Pvt. Ltd. , New Delhi – 2008

Fundamentals Of Computer Graphics And Multimedia – D. P. Mukherjee, Prentice Hall Of India Pvt. Ltd. , New Delhi – 1999

Multimedia Graphics, John Villamil, Casanova , LeonyFernanadez, Eliar, PHI,1998.

Outcomes	• Students will gain knowledge about Computer Graphics and their applications • Students will able to know about the transformation and viewing techniques.

Semester - V				
Course code 22BCE5P1	**Core Practical-V**	**T/P**	**C**	**H/W**
	Relational Database Management Systems Lab	**P**	**4**	**6**

Objectives The following concepts must be introduced to the students:

DDL Commands

- Create table, alter table, drop table

DML Commands

- Select, update, delete and insert statements
- Condition specification using Boolean and comparison operators (and, or,not,=,<>,>,<,>=,<=)
- Arithmetic operators and aggregate functions (Count, Sum, Avg, Min, Max)
- Handling Multiple table queries
- Arranging using order by

PL/SQL Programming

- Simple PL/SQL programs with Table handling
- Concepts of Trigger, Procedures and Cursor

Group- A

1. Create a student table with the following attributes name, register number, department, marks in 5 subjects and total.
(a) Insert few records into student table.

(b) Display all the records

(c) Calculate the total marks for all the records.

(d) Display the information of student name, register number and total only.

2. Create a student table with the following attributes name, registernumber, department, marks in 5 subjects and total.
(a) Insert few records into student table.
(b) Modify the name of the student as vignesh whose register number is 211278019.
(c) Delete the records whose register number is 211278005.
(d) Display all the records.

3. Create a table student with name, roll number, gender, age and mobile number. Apply the following integrity rules to the student table
(a) The student name must be in capital letter.

(b) The roll number must be greater than zero.

(c) The age cannot be a null value.

(d) The gender must be “Male” or “Female” or “Transgend”

(e) The mobile number may contain null values.

4. Create a table student_master with the following attributes name, regno, dept and year of joining with suitable data types. Use Select command to do the following.
(a) Display all the column in the student_ master table .

(b) Display the student’s name column only.

(c) Eliminate the duplicate entry in student_mastertable.

(d) Select the details of student who is studying computer science department

(e) Sort the attribute name in alphabetical order.

5. Create a table sales_order_details with the s_order_no as primary key and it contains the following fields: product_no, description, qty_ordered, qty_disp, product_rate, profit_percent, sell_price, supplier_name. Use Select command to do the following

(a) Select each row and compute sell_price*.50 and sell_price*1.50 for each row selected.

(b) Select product_no, profit_percent, Sell_price where profit_per is not between 10 and 20 both inclusive.

(c) Select product_no, description, profit_percent, sell_price where profit_percent is not between 20 and 30.

(d) Select the suppliername and product_no where suppliername has 'r' or 'h'as second character.

6. Create an Employee table with the following attributes: employee_number, name, job and manager_id. Set the manager_id as a foreign key for creating self referential structure.

(a) Insert few records

(b) Display all the records

(c) Display the employee details who are working under particular manager_id.

7. Create an Employee table with the following attributes: employee_number, employee_name, department_number, job and salary.

(a) Query to display the employee_name and Salary of all the employees earning more than 20000 INR.

(b) Query to display employee_name and department_number for the particular employee _number.

(c) Query to display employee_name and Salary for all employees whose salary is not in the range of INR 15000 and INR 30000.

8. Create an Employee table with the following attribute employee_number, employee_name, job_type, hire_date, department_number and salary.

(a) Query to display employee_name and department_number of all the employees in department_number 10 and Department number 20 in the alphabetical order by name.

(b) Query to display Name of all the employees where the third letter of their name is =A.

(c) Query to display Name with the 1st letter capitalized and all other letter lowercase

(d) Query to display Name of all employees either have two R's or have two A's in

	their Name. 9. Create an Employee table with the following attributes: employee_number, name, job, hire_date and manager_id. Set the manager_id as a forein key for creating self-referential structure. (a) Query to display name and Hire Date of every Employee who was hired in 2007. (b) Query to display name and calculate the number of months between today and the date each employee was hired. (c) Query to display name and job of all employees who don‘t have a current Manager.
Group- B	10. Create a table sales_order with s_order_no, client_number, delivery_address, delivery_date and order_status. Define the s_order_no as primary key using column level Constraints. (a) Create another table named as sales_order_copy with the same structure of sales_order table. Define the s_order_no as primary key using table level constraints. (b) Add a new column for storing salesman_number in sales_order using ALTER Command. (c) Modify the size of delivery_address in sales_order table using ALTER command. (d) Display the structure of sales_order table 11. Create an Employee table with the following attribute employee_number, employee_name, job_type, hire_date, department_number, salary and commission. (a) Query to display the Highest, Lowest, Sum and Average Salaries of all the Employees (b) Query to display the employee_number and employee_name for all employees who earn more than the average salary. (c) Query to display the employee_name, salary and commission for all the employees who earn commission. (d) Sort the data in descending order of salary and commission (e) Query to display employee_name, salary and commission for all employees whose commission is greater than their salary increased by 5%. 12. Create a DEPARTMENT table with the attributes of department_number and department_name. Set the department_ number as a primary key. (a) Insert few records (b) Display all the records (c) Create an employee table with the following attribute employee_number, employee_name, job and department_number. Set the employee_number as a primary key and set the department_number as a foreign key. (d) Query to display the employee details who are working in the particular department_number. (e) Query to display employee_number, employee_name and job from the employee table (f) Query to display unique jobs from the employee Table (g) Query to display the employee_name concatenated by a job separated by a comma.

	13. Create a DEPARTMENT table with the attributes of department_number and department_name. Set the department number as a primary key. (a) Create an Employee table with the following attributes: employee_number, name, job_type, department_number and location. (b) Query to display Unique Listing of all Jobs that are in department_number 20. (c) Query to display employee name, department_name and department_number for all the employees. (d) Query to display name, Job, department_number and department_name for all the employees working at the Mumbai location. 14. Create a table client-master with the following fields: client_no, name, address, city, state, pincode, remarks, bal_due with suitable data types. (a) Create another table supplier_master from client_master. (b) rename the attribute client_no with supplier_no and the attribute **name** with supplier_name in the supplier_master table (c) Insert data into client_master (d) Insert data into supplier_master from client_master. (e) Delete the row which is having the value chennai in the city attribute of client_master table. (f) Drop the client_master table 15. Create a table master_book to contain the information of magazine_code, magazine_name and publisher, magazine_type (Weekly/biweekly/monthly) and price. Write a PL/SQL block to perform insert, update and delete operations on the above table 16. Create a table to contain phone_number, user_name, address of the phone user. Write a function to search for an address using phone numbers. 17. Create a table to store the salary details of the employees in a company. Declare the cursor to contain employee_number, employee_name and net_salary. Use cursor to update the employee salaries. 18. Create a table to contain the information about the voters in a particular constituency. Write a proper trigger to update or delete a row in the table. 19. Create a table employee to contain the information of employee_name, employee_number and salary. (a) Write a procedure to increase 10% of salary to all employees (procedure without argument). (b) Write a procedure to increase specific percentage for specific department number (procedure with argument).
Note: **One Question from Group A and another one Question from Group B is compulsory for University Examination**	
Outcomes	• Students were able to work with various queries • Students were able to know about database concepts, triggers, cursor programming etc.

Semester - IV				
Course code 22BCE5P2	**Core Practical-VI**	**T/P**	**C**	**H/W**
	PYTHON PROGRAMMING LAB	**P**	**4**	**6**

Objectives

- Acquire programming skills in core Python.
- Acquire Object-oriented programming skills in Python.
- Develop the skill of designing graphical-user interfaces (GUI) in Python.
- Develop the ability to write database applications in Python.

Group- A

1. Write a Python program that accepts an integer (n) and computes the value of n+nn+nnn.
2. Write a Python program to compute the distance between the points (x1, y1) and (x2, y2).
3. Write a Python program to convert seconds to day, hour, minutes and seconds.
4. Write a Python program to compute the greatest common divisor (GCD) of two positive integers.
5. Write a Python program to convert an integer to binary keep leading zeros.
6. Write a Python program to count the number occurrence of a specific character in a string.
7. Write a Python function to find the maximum and minimum numbers from a sequence of numbers. Do not use built-in functions.
8. Write a Python program to find the number of divisors of a given integer is even or odd.
9. Write a Python program that accept a positive number and subtract from this number the sum of its digits and so on. Continues this operation until the number is positive.
10. Write a Python program to get a string from a given string where all occurrences of its first char have been changed to '$', except the first char itself.
11. Write a Python program to count occurrences of a substring in a string.
12. Write a Python function that takes a list of words and return the longest word and the length of the longest one.
13. Write a Python program to count the number of strings where the string length is 2 or more and the first and last character are same from a given list of strings.
14. Write a Python function to sum all the numbers in a list.
15. Create a dictionary and apply the following methods: Print the dictionary items, access items, use get() , Change values , use len()

	16. Create a tuple and perform the following methods: Add items, len() , check for item in tuple, Access items 17. Write a python program to create two sets and perform the following operations: Union, Intersection, Difference, Asymmetric Difference. 18. Write a Python script to check whether a given key already exists in a dictionary. 19. Write a Python program to check whether an element exists within a tuple.
Group- B	1. Write a Python function to calculate the factorial of a number (a non-negative integer). The function accepts the number as an argument. 2. Write a Python function that checks whether a passed string is palindrome or not. 3. Write a Python class which has two methods get_String and print_String. get_String accept a string from the user and print_String print the string in upper case. 4. Write a Python class named Circle constructed by a radius and two methods which will compute the area and the perimeter of a circle. 5. Write a Python program to count the number of lines in a text file. 6. Write a python program to define a module to find Fibonacci numbers and import the module to another program. 7. Write a script named copyfile.py. This script should prompt the user for the names of two text files. the contents of the first file should be input and written to the second file. 8. Demonstrate a python code to print try, except and finally block statements 9. Write a 2D Graphics program for the following (a) Draw a Star (b) Draw a letter (c) Draw a hexagon with color. 10. Write a python program to animate an object from left to right and right to left. 11. Write a python program for displaying the database records from SQL. 12. Write a python program to demonstrate the use of Java program.
Note: **One Question from Group A and another one Question from Group B is compulsory for University Examination**	
Outcomes	• Students were able to understand the concept of Python programming. • Students were able to execute programs for real time applications.

Semester - VI				
Course code 22BCE6E1	**DSE -I**	**T/P**	**C**	**H/W**
	(A) COMPUTER NETWORKS	**T**	**6**	**6**

Objectives	• To develop an understanding of computer networking basics. • To develop an understanding of different components of computer networks, various protocols, modern technologies and their applications.
Unit -I	**Uses of Computer Networks:**– Network Hardware –Network software – OSI and TCP/IP Reference models – Example Networks :Internet.
Unit-II	**The Physical Layer:** Guided Transmission Media – Wireless Transmission– Communication Satellites – Public Switched Telephone Network – The Mobile Telephone System
Unit -III	**Data Link Layer:** Design Issues – Error Detection and Correction – Elementary Data link Protocols – Sliding Window Protocol - **Medium Access Control Layer:** Channel Allocation Problem – Multiple Access Protocol – Ethernet.
Unit -IV	**Network Layer:** Design Issues – Routing Algorithms. **Transport Layer:** Transport Services – Elements of Transport Protocols.
Unit -V	**Application Layer:** DNS– Electronic Mail – World Wide Web Architectural overview. **Network Security:** Cryptography – Symmetric Key Algorithms – Public Key Algorithms

Text Book:

Computer Networks, Andrew S Tanenbaum and D. J. Wetherall, 5th Ed, Pearson,2011.

Books for Reference:

UylessD.Black, Computer Networks, PHIE.

Data and Computer Communications, PHI, W.Stallings

Data Communications and Computer Networks, Brijendra Singh ,Second Edition,PHI, 2006.

Data Communications and Computer Networks , Prakash C. Gupta, Prentice Hall of India, 2005.

Data Communications and Networks ,Achyut S Godbole, TMH,2005.

Data Communication and Networking ,Behrouz A. Forouzan, TMH, 2005.

Outcomes	• Students will able to recognize the technological trends of Computer Networking • Students will gain knowledge about technological components of the Network.

Semester - VI				
Course code 22BCE6E2	**DSE -I**	**T/P**	**C**	**H/W**
	(B)NETWORK SECURITY	**T**	**6**	**6**

Objectives	• To understand the underlying principles of cryptography and network security. • To teach the concepts of securing computer network protocols, based on the application of cryptography techniques.
Unit -I	**Introduction:** Security trends – Legal, Ethical and Professional Aspects of Security,Need for Security at Multiple levels, Security Policies – Model of network security Security attacks, services and mechanisms – OSI security architecture – Classical encryption techniques: substitution techniques, transposition techniques, steganography- Foundations of modern cryptography: perfect security – information theory – product cryptosystem – cryptanalysis.
Unit-II	**Symmetric key cryptography:** Mathematics of symmetric key Cryptography: Algebraic structures – Modular arithmetic-Euclid‟s algorithm- Congruence and matrices –Groups, Rings, Fields- Finite fields- **SYMMETRIC KEY CIPHERS:** SDES – Block cipher Principles of DES – Strength of DES – Differential and linear cryptanalysis – Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – Advanced Encryption Standard – RC4 – Key distribution.
Unit -III	**Public key cryptography:** Mathematics of asymmetric key Cryptography: Primes – Primality Testing – Factorization – Eulers totient function, Fermat,,s and Euler,,sTheorem – Chinese Remainder Theorem – Exponentiation and logarithm – **ASYMMETRIC KEY CIPHERS:** RSA cryptosystem – Key distribution – Key management – Diffie Hellman key exchange – ElGamal cryptosystem – Elliptic curve arithmetic- Elliptic curve cryptography.
Unit -IV	**Message authentication and integrity:** Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – SHA – Digital signature and authentication protocols – DSS **Entity Authentication:** Biometrics, Passwords, Challenge Response protocols- Authentication applications – Kerberos,X.509.
Unit -V	**Security practice and system security:** Electronic Mail security – PGP, S/MIME – IP security – Web Security – **SYSTEM SECURITY:** Intruders – Malicious software – viruses – Firewalls.

Text Book:

William Stallings, ―*Cryptography and Network Security: Principles and Practice* ", PHI 3rd Edition, 2006.

Books for Reference:

C K Shyamala, N Harini and Dr. T R Padmanabhan " *Cryptography and Network Security*", Wiley IndiaPvt.Ltd

Behrouz A.Foruzan, "*Cryptography and Network Security",* Tata McGraw Hill2007.

Charlie Kaufman, Radia Perlman, and Mike Speciner, "Network Security: PRIVATE Communication in a PUBLIC World, Prentice Hall", ISBN0-13-046019-2.

Outcomes	• Students will able to understand the most common type of cryptographic algorithm. • Students will understand the Public-Key Infrastructure and security protocols for protecting data on networks

Semester - VI				
Course code 22BCE6E3	**DSE-II**	**T/P**	**C**	**H/W**
	(C)MOBILE COMPUTING	**T**	**6**	**6**

Objectives	• To develop an understanding of the ways that mobile technologies can be used for teaching and learning. • To understand the impact of mobile computing on the field of education.
Unit -I	**Introduction:** Laptop computing – Wireless Technologies – Mobility and Portability – Overview of IP and Routing – Mobile networking – Example Architectures – The role of IETF in mobile networking.
Unit-II	**Cellular communication concepts:** Wireless transmission – Multiplexing –Modulation – Spread Spectrum – Cellular system – GSM architecture – protocols – handover procedure – security.
Unit -III	**Advertisement and registration :** Agent solicitation and Discovery Mechanism – Router Discovery Protocol – Agent advertisement – Agent operation – Agent discovery – registration overview – Authentication overview – Registration request, reply and extensions – Mobile node registration procedures – Foreign agent registration actions – Home agent Processing
Unit -IV	**Data grams and route optimizations :** Tunneling overview and terminology– Encapsulation – Routing failures – Tunnel management – Decapsulation – Unicast broadcast and multicast data gram routing – Mobile routers – Route optimization – Message format – Extensions – Mobile key requests.
Unit -V	**IP versions and DHCP** : Mobility support in IP version 6 – smooth hand off – Renumbering – DHCP – WAP protocol. **Security and motivation detection**: Ingress filtering – Reverse tunneling – Broadcast preference extensions – Movement detection – Localizing registrations.

Text Books:

Charles E.Perkins, "*Mobile IP: Design Principles and Practices*", Addison Wesley, USA 1999

William Lee, "*Mobile Telecommunications"* McGraw Hill Singapore 2001

Jochen Schiller – *"Mobile Communication*" Pearson Education New Delhi 2003

Reference:

David J Goodman "*Wireless Personal Communication systems*" Addison Wesley Wireless communication series USA 1999

Raj Pandya, *"Mobile and Personal Communication Systems and Services*" IEEE Press, USA 2004.

Outcomes	• Students will able to know about the concepts of Mobile Communication and to analyse next generation Mobile Communication System. • Students will able to know about network and transport layers of Mobile Communication and analyze various protocols of all layers for mobile and ad hoc wireless communication networks.

Semester - V I				
Course code 22BCE6E4	**DSE-II**	**T/P**	**C**	**H/W**
	(D)DATA MINING AND DATA WAREHOUSING	**T**	**6**	**6**

Objectives	• To introduce the concepts of data ware house and data mining, which gives a complete description about the principles, used, architectures, applications, design and implementation of data mining and data ware housing concepts.
Unit -I	**INTRODUCTION:** What is a data Warehouse? DELIVERY PROCESS: Data warehouse delivery method SYSTEM PROCESSES: Introduction – Overview – Typical process flow within a data warehouse – Extract and load process – Clean and transform data – Backup and archive process – Query management process. PROCESS ARCHITECTURE: Introduction – Load manager – Warehouse manager – Query manager
Unit-II	**SYSTEM AND DATA WARE HOUSE PROCESS MANAGERS**: Introduction – Why you need tools to manage a data warehouse – system managers – Data warehouse process managers – Load manager – Warehouse manager – Query manager CAPACITY PLANNING, TUNING AND TESTING Introduction – Process – Estimating the load TUNING THE DATA WAREHOUSE Introduction – Assessing performance – Tuning the data load – Tuning queries
Unit -III	**INTRODUCTION**: Introduction – Basics of Data Mining – Data Mining Versus Knowledge Discovery in Database – Data Mining Issues – Data Mining Metrics – Social Implications of Data Mining – Data Mining from a Database Perspective
Unit -IV	**RELATED CONCEPTS**: Database/OLTP Systems – Fuzzy Sets and Fuzzy Logic – Information Retrieval – Decision Support Systems – Dimensional Modeling – OLAP – Web Search Engines DATA MINING TECHNIQUES Introduction – A Statistical Perspective on Data Mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms
Unit -V	**ASSOCIATION RULES**: Introduction – Large Itemsets – Basic Algorithms – Parallel and Distributed Algorithms –Comparing Approaches – Incremental Rules – Advanced Association Rule Techniques – Measuring the Quality of Rule Techniques – Measuring the Quality of Rules

Text Books:

Data Warehousing In The Real World,Sam Anahory, Dennis Murray, Pearson Education [LPE], Thirteenth Indian Reprint, 2005.

Data Mining Introductory And Advanced Topics, Margaret H.Dunham, Pearson Education [LPE] First Impression, 2006.

Books for Reference:

Insight Into Data Mining Theory And Practice By K.P.SomanShyamDiwakar V.Vijay PHI Publication

Data Warehousing, Data Mining And Olap By Alex Berson And Stephen J.SmithTMH Publication

Data Mining Introductory And Advanced Topics, Margaret H.Dunham, Pearson Education [LPE] First Impression, 2006

Outcomes	• Students will able to understand the functionality of the various data mining and data warehousing component. • Students will able to Compare different approaches of data ware housing and data mining with various technologies.

Semester - VI				
Course code 22BCE6E5	**DSE-III**	**T/P**	**C**	**H/W**
	(E).Net Technologies	**T**	**6**	**6**

Objectives	➢ Know about basics of Net Framework and its working ➢ Know about C# basics and its programming concepts ➢ Learn about advanced and latest features of C# ➢ Know about ADO.net basics and its applications ➢ Know about programming aspects of ASP.net and its applications ➢ Design and develop a website using latest features of Asp.net and C# language ➢ Know about programming aspects of MVC and its applications
Unit -I	Fundamentals of .Net - .NET Framework Essentials - Microsoft .NET - The .NET Platform - NET Framework Design Goals - .NET Framework - The Common Language Runtime - CLR Environment - CLR Executables – Metadata - Assemblies and Manifests - Intermediate Language (IL) - The CTS and CLS - CLR Execution - Common Programming Model - Core Features and Languages - Language Integration
Unit-II	ADO.NET Data Providers - ADO.NET SQL Server - ADO.NET Connection - ADO.NET Command - ADO.NET Data Reader - ADO.NET Data Set - ADO.NET Data Adapter - ADO.NET Data Tables
Unit -III	What is Entity Framework - What is ORM? - Entity splitting, table splitting - DB first - Code First - Code First Conventions - Code First Data Annotations - Database Initialisers - Code First Migrations - Loading related entities
Unit -IV	**ASP.NET:** The System.Web.UI Namespace - Web Form Syntax - ASP.NET Application Development - ASP.NET and Web Services - Data Binding and the Use of Templates - State Management and Scalability **Windows Forms:** Introducing Windows Forms - The System.Windows.Forms Namespace - Windows Forms Development - Windows Forms and Web Services
Unit -V	MVC - ASP.NET MVC in Context - The MVC Pattern - Essential Language Features - Working with Razor - Essential Tools for MVC - URL Routing - Controllers and Actions – Filters – Views - Helper Method - Model Binding - Model Validation

Reference and Text Book:-

Thuan L Thai & Hoang Lam, ".NET Framework Essentials", 3rd Edition, O'Reilly. **(Unit 1,2 & 4)**

Stack overflow contributors, ".Learning Entity Framework", eBook, Stack overflow. **(Unit 3)**

Adam Freeman, "Pro ASP.NET MVC 5", 5th Edition, Apress **(Unit 5)**

Outcomes	After Completing this course, the students are able to: ➢ Understanding the basics of .Net Framework ➢ Advanced and latest features of C#, ADO.net basics, Entity Framework, ASP.net, Tier of architecture & MVC5.

Semester - VI				
Course code 22BCE6E6	**DSE-III**	**T/P**	**C**	**H/W**
	(F)EMBEDDED SYSTEMS	**T**	**6**	**6**

Objectives	➢ Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system. ➢ Describe the hardware software co-design and firmware design approaches ➢ Know the RTOS internals, multitasking, task scheduling, task communication and synchronisation ➢ Learn the development life cycle of embedded system
Unit -I	Introduction to Embedded system - Embedded system vs General computing systems - History - Classification - Major Application Areas - Purpose of Embedded systems - Smart running shoes: The innovative bonding of lifestyle with embedded technology - Characteristics and Quality Attributes of Embedded systems.
Unit-II	Elements of an Embedded system - core of the embedded system: General purpose and domain specific processors, ASICs, PLDs, COTS - Memory - Sensors and Actuators - Communication Interface: Onboard and External Communication Interfaces - Embedded Firmware - Reset circuit, Brown-out protection circuit, Oscillator unit, Real-time clock, and Watchdog timer - PCB and Passive Components.
Unit -III	Embedded Systems - Washing machine: Application-specific - Automotive: Domain specific. Hardware Software Co-Design - Computational Models - Embedded Firmware Design Approaches - Embedded Firmware Development Languages - Integration and testing of Embedded Hardware and firmware.
Unit -IV	RTOS based Embedded System Design: Operating System Basics - Types of operating Systems - Tasks, process and Threads - Multiprocessing and Multitasking - Task Scheduling- Task Communication - Task Synchronization - Device Drivers - choosing an RTOS.
Unit -V	Components in embedded system development environment, Files generated during compilation, simulators, emulators and debugging - Objectives of Embedded product Development Life Cycle – Different Phases of EDLC - EDLC Approaches - Trends in Embedded Industry - Case Study: Digital Clock.

Text Book:

K. V. Shibu, "*Introduction to embedded systems*", TMH education Pvt. Ltd. 2009.

Reference Books

Raj Kamal, "*Embedded Systems: Architecture, Programming and Design*", TMH. Second Edition 2009

Frank Vahid, Tony Givargis, "*Embedded System Design*", John Wiley. Third Edition 2006

Cliff Young, Faraboschi Paolo, and Joseph A. Fisher, "*Embedded Computing: A VLIW Approach to Architecture, Compilers and Tools*", Morgan Kaufmann Publishers, An imprint of Elsevier, 2005.

David E. Simon, "*An Embedded Software Primer*" Pearson Education, 1999

Outcomes	➢ Describe the differences between the general computing system and the embedded system, also recognize the classification of embedded systems. ➢ Become aware of interrupts, hyper threading and software optimization. ➢ Design real time embedded systems using the concepts of RTOS.

Semester - VI				
Course code 22BCE6E7	**DSE-IV**	**T/P**	**C**	**H/W**
	(G)Internet of Things	**T**	**6**	**6**

Objectives	➢ To understand the characterization and significance of the Internet of Things ➢ To recognize the building block of Internet of Things ➢ To learn about data and analytics for IoT
Unit -I	Genesis of IoT – IoT and Digitization – IoT Impact –IoT Challenges – IoT Network Architecture and Design – Drivers – IoT Architecture – IoT Functional Stack – IoT Data Management and Compute Stack
Unit-II	The "Things" of IoT – Sensors, Actuators and Smart Objects **–** Sensor Networks **–** Connecting Smart Objects – Communication Criteria – IoT Access Technologies – IEEE 802.15.4 – Standardization and Alliances – Physical Layer – MAC Layer – Topology – Security – Competitive Technologies
Unit- III	IP as IoT Network Layer – Key advantages of Internet Protocol – Adoption or Adaptation of the Internet Protocol – Need for Optimization – Constrained nodes – Constrained Networks – IP Versions – Optimization IP for IoT – Profiles and Compliances
Unit -IV	Application Protocols for IoT – Transport Layer – IoT application Transport Methods – SCADA – Generic Web based protocols – IoT application layer protocol – CoAP - MQTT
Unit -V	Data and Analytics for IoT - Introduction to Data Analytics for IoT - Machine Learning - Big Data Analytics Tools and Technology - Edge Streaming Analytics - Network Analytics

Text Books:

Hanes, D., Salgueiro, G., Grossetete, P., Barton, R., & Henry, J. (2017). *IoT fundamentals: Networking technologies, protocols, and use cases for the internet of things*. Cisco Press.

Reference Books:

Raj, P., & Raman, A. C. (2017). *The Internet of Things: Enabling technologies, platforms, and use cases*. Auerbach Publications.

Kranz, M. (2016). *Building the internet of things: Implement new business models, disrupt competitors, transform your industry*. John Wiley & Sons.

McEwen, A., &Cassimally, H. (2013). *Designing the internet of things*. John Wiley & Sons.

Outcomes	➢ The student will understand the characterization and significance of the Internet of Things ➢ The student is capable to recognize the building block of Internet of Things ➢ The student will get better insight about data and analytics for IoT

Semester - VI				
Course code 22BCE6E8	**DSE-IV**	**T/P**	**C**	**H/W**
	(H)CLOUD COMPUTING	**T**	**6**	**6**

Objectives	• To know about the basics of cloud computing. • To know about cloud and virtualization along with it how one can migrate over it.
Unit -I	**Understanding Cloud Computing** : Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services
Unit-II	**Developing Cloud Services** : Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds
Unit -III	**Cloud Computing For Everyone** : Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation
Unit -IV	**Using Cloud Services** : Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases – Storing and Sharing Files
Unit -V	**Other Ways To Collaborate Online** : Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis

Text Book:

Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.

Book for Reference:

Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

Outcomes	➢ Students will able to learn the main concepts, key technologies, strengths and limitations of cloud computing. ➢ Students will able to understand and use the architecture of compute and storage cloud, service and delivery models.

Semester - VI			
Course code 22BCE6PR	**Project**	**C**	**H/W**
		6	**10**

Objectives

1. The students will be allowed to work on any project based on the concepts studied in core/elective courses.
2. The project work should be compulsorily done in the college only under the supervision of the department staffs.
3. The combined project shall be undertaken by the students as a team of two.
4. The number of teams should be equally assigned to existing Staff members.
5. The following list of parameters taken into account for the evaluation of Project work and Viva-voce.
   Total Marks: 100 (Internal: 40 marks, External: 60 Marks)

Parameters:

For Internal Marks: Two review meetings - 2 × 10 = 20 Marks
Overall Performance = 5 Marks

Total = 25 Marks

For External Marks: Project Report = 25 Marks
Project demo &Presentation = 25Marks
Viva-Voce = 25 Marks

Total = 75 Marks

♣♣♣♣♣♣♣♣♣♣

Outcomes

- Students will able to recognize the technological trends of Computer Networking
- Students will gain knowledge about technological components of the Network.

Course code	Allied Theory - IA	T/P	C	H/W
22BCAA1	**DATA STRUCTURES AND C**	**T**	**3**	**3**

Objectives	➢ To understand basic concepts of C ➢ To develop C programs using arrays, functions. ➢ To develop modular applications using pointers and structures ➢ To do file handling in C
Unit -I	**C PROGRAMMING BASICS:** Structure of a C program – compilation and linking processes – Constants, Variables – Data Types – Expressions using operators in C – Managing Input and Output operations – Decision Making and Branching – Looping statements. Arrays – Initialization – Declaration – One dimensional and Two-dimensional arrays. Strings- String operations – String Arrays. Simple programs- sorting-searching – matrix operations.
Unit-II	**FUNCTIONS, POINTERS, STRUCTURES AND UNIONS** Functions – Pass by value – Pass by reference – Recursion – Pointers – Definition – Initialization – Pointers arithmetic. Structures–Definition- Structure within a structure – Union — Storage classes, Pre-processor directives.
Unit-III	**LINEAR DATA STRUCTURES** Arrays and its representations – Stacks and Queues – Linked lists – Linked list-based implementation of Stacks and Queues – Evaluation of Expressions – Linked list based polynomial addition.
Unit-IV	**NON-LINEAR DATA STRUCTURES** Trees – Binary Trees – Binary tree representation and traversals –Binary Search Trees – Applications of trees. Graph and its representations – Graph Traversals.
Unit-V	**SEARCHING AND SORTING ALGORITHMS** Linear Search – Binary Search. Bubble Sort– Merge sort – Quick sort – Hash tables – Overflow handling.

Reema Thareja, *Introduction to C programming* from Oxford University press

Balagurusamy E, *Computing Fundamentals & C Programming*, Tata McGraw-Hill, Second Reprint 2008, ISBN 978-0-07-066909-3.

Ashok N Kamthane: *Programming with ANSI and Turbo C,* Pearson Edition Publ, 2002.

Horowitz, E., Sahni, S., & Anderson Freed, S. (2007). *Fundamentals of Data Structures in C* (2nd ed.). Universities Press.

Tanenbaum, A.S., Langsam, Y., & Augenstein, M.J. (2019). *Data Structures using C*.PHI/Pearson Education.

Reference Books:

Paul Deitel and Harvey Deitel, "*C How to Program with an Introduction to C++",* Eighth edition, Pearson Education, 2018.

Yashwant Kanetkar, *Let us C*, 17th Edition, BPB Publications, 2020.

Pradip Dey, Manas Ghosh, "*Computer Fundamentals and Programming in C*", Second Edition, Oxford University Press, 2013.

Anita Goel and Ajay Mittal, "*Computer Fundamentals and Programming in C*", 1st Edition,

<table>
<tr><td colspan="2">Pearson Education, 2013.

Gilberg, R. F., & Forouzan, B.A. (2005). Data Structures: A Pseudocode Approach with C (2nd ed.). Cengage Learning.</td></tr>
<tr><td>Outcomes</td><td>➢ Understand programming paradigms in C
➢ Understand and apply C programming concepts
➢ Implement linear and non-linear data structure operations using C
➢ Suggest appropriate linear / non-linear data structure for any given data set.
➢ Apply hashing concepts for a given problem
➢ Modify or suggest new data structure for an application</td></tr>
</table>

Course code 22BCAAP1	Allied Practical - IA	T/P	C	H/W
	Data Structures using C Lab	**P**	**2**	**2**
Objectives	➢ To cover various concepts of C programming language, searching and sorting algorithms ➢ It provides an understanding of data structures such as stacks and queues.			
Lab Programs	1. Find out the given number is perfect number or not using C program. 2. Write a C program to check whether the given number is Armstrong or not. 3. Write a C program to find the sum of individual digits of a positive integer. 4. Write a C program to print the Fibonacci series. 5. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user. 6. Write a C Program to find the grade of a student using else if ladder 7. Write a program to do arithmetic operations using Switch case 8. Write a program to sum the first hundred natural numbers using while, do while and For loop. 9. Write a C program to find both the largest and smallest number in a list of integers using function. 10. Write a C Program to add, subtract and multiply two matrices 11. Write a C Program to sort the numbers using function. 12. Write a program to perform various string operations. 13. Write a C Program to generate student mark list using array of structures 14. Write a program that uses functions to perform the following operations on singly linked list.: i) Creation ii) Insertion iii) Deletion iv) Traversal 15. Write a program that implement stack (its operations) using i) Arrays ii) Pointers 16. Write a program that implement Queue (its operations) using i) Arrays ii) Pointers 17. Write a program that implements the following sorting methods to sort a given list of integers in ascending order: i) Bubble sort ii) Insertion sort 18. Write a program that use both recursive and non-recursive functions to perform the following searching operations for a Key value in a given list of integers: i) Linear search ii) Binary search 19. Write a program to implement the tree traversal methods. Write a program to implement the graph traversal methods.			

Course code 22BCAA2	Allied Theory - IB	T/P	Credits	H/W
	Desktop Publishing	**T**	**3**	**3**

Objectives	➢ Students will learn of basics of Corel Draw drawing and coloring. ➢ Students will learn to working with Bitmap commands. ➢ Students will understand how to work with Photoshop, layers, Type and filters.
Unit -I	**Getting started with Corel Draw:-** Introduction to Corel Draw, Features of Corel Draw, Corel Draw Interface Tool Box, Moving from Adobe Illustrator to Corel Draw. **Common Tasks Drawing and Coloring:-** Introduction, Selecting Objects, Creating Basic Shapes, Reshaping Objects, Organizing objects, Applying Color Fills and Outlines
Unit-II	**Mastering with Text:-** Introduction Text Tool, Artistic and Paragraph Text, Formatting Text, Embedding Objects into text, Wrapping Text around Object Linking, Text to Objects. **Applying Effects**:- Introduction, Power of Blends, Distortion Contour Effects, Envelopes, Lens effects, Transparency, Creating Depth Effects, Power Clips.
Unit-III	**Working with Bitmap Commands**:- Introduction, Working with Bitmaps, Editing Bitmaps, Applying effects on Bitmaps Printing, Converting Objects to Bitmap, 3D Effect, Art Effect, Blur Effect, Color Transformation Effect, Contour Effect, Creative Effect, Distort Effect.
Unit-IV	**Getting Started with Photoshop:-** Exploring the Toolbox, The New CS4 Applications, Bar & the Options Bar, Exploring Panels & Menus, Creating & Viewing a New, Document, Customizing the Interface, Setting Preferences. **Introduction**:- Working with images, Making Selections, Resizing & Cropping Images.
Unit-V	**Getting Started with Layers**:– Layers Palette, Working with Layers, Hiding/Showing Layers, Flattening Images, Working with Adjustment Layers, Layer Effects, Painting in Photoshop, Photo Retouching. **Type:-** Creating Type, Type Tool, Moving the Text, Creating Paragraph Type, Resizing a bounding box, Changing the Type Settings, Converting Point Type to Paragraph Type, Converting Type Layers to Standard Layers, Type Masking. **Filters:-** The Filter Menu, Filter Gallery, Extract Filter, Liquefy Filter, Vanishing Point Filter, Artistic Filters, Blur Filters, Brush Stroke Filters, Distort Filters, Noise Filters, Pixelate.

Reference and Textbooks:

Text Books:

Soumya Ranjan Behera (2014). *Smart DTP Course*. BPB Publications

Xenakis, D., & Levisay, B. (2001). *Photoshop 6 In Depth*. New Delhi: DreamTech Press.

Book for Reference:

Bittu Kumar (2015). *Desktop Publishing.* V & S Publishers.

Outcomes	On Completion of this Course, the students can able to ➢ Draw, edit, format and develop graphics using CorelDRWA application software. ➢ Working with text and applying the effects using Corel Draw. ➢ Working with Bitmap Commands and 3D effects. ➢ Getting Started with Photoshop and working with images. ➢ Create, format, edit and develop images using Adobe Photoshop software.

Course code	Allied Practical - IB	T/P	Credits	H/W
22BCAAP2	**Desktop Publishing Lab**	**P**	**2**	**2**

Objectives	➢ The course has been designed for the participants intending to build their career in desktop publishing.
Lab Programs	**Corel DRAW** 1. Designing a Visiting Card in Corel Draw. 2. Designing a Notice in Corel Draw. 3. Designing a Certificate in Corel Draw. 4. Designing an Advertisement in Corel Draw. 5. Designing a house in Corel Draw using various Tools with a Scenery Back ground. 6. Create a design using freehand tool and its flyouts. 7. Apply some effects to the design created, using interactive blend tool. **Photo Shop** 1. Converting an Image in Gray scale into Color in Photo Shop. 2. Designing a visiting Card in Photo Shop. 3. Changing the background of an image in Photoshop. 4. Creating Wall poster using Photoshop. 5. Creating a Greeting Card in Photo shop. 6. Create multiple copies of Passport Size Photo.
Outcomes	On Completion of this Course, the students can able to ➢ Effectively & efficiently produce formatted text and graphics.

Course code	Allied Theory - IIA	T/P	C	H/W
22BCAA3	**Discrete Mathematics**	**T**	**3**	**3**

Objectives	➢ To understand the basic concepts of Discrete Mathematical Structure ➢ To gain knowledge about mathematical model, expression to solve real time problems
Unit -I	**Fundamental Structures:-** Set Theory, Sets, Venn Diagrams, Complements, Cartesian Products, Power Sets, Finite and Infinite Sets. **Functions:-** Surjections, Injections, Inverses, Composition. **Relations:-** Reflexivity, Symmetry, Transitivity, Equivalence Relations.
Unit-II	**Logic:-** TF Statements, Connective, Disjunction, Negation, Conditional Statements, Bi Conditional Statements, Atomic and Compound Statements, Well-formed Formulae, The Truth Table, Tautology, Tautological Implication Formulae with Distinct Truth Tables.
Unit-III	**Normal Forms:-** Principles of Normal Forms, Theory of Inference, Open Statements, Quantifiers, Valid Formulae and Equivalence, Theory of Inference for Predicate Calculus.
Unit-IV	**Graph Theory:-** Definition, Degrees, Sub Graph, Isomorphism, Complete Graph, Bipartite Graph, Paths, Cycles, Connectedness.
Unit-V	**Trees:** Spanning Tree – Kruskal's Algorithm, Prim's Algorithm, Dijkstra's Algorithm, Cut Set and Cut Vertices, Eulerian-Hamiltonian Graph. **Boolean Algebra:-** Boolean Algebra, Boolean Functions.

Reference and Textbooks:

Jean-Paul Trembly & Manohar, R. (2017). *Discrete Mathematics Structures with Applications to Computer Science.* Tata Mc Graw-Hill.

Venkataraman, M.K., Sridharan, N., & Chandrasekaran, N. (2009). *Discrete Mathematics*. National Publishing co.

Outcomes	➢ Students will able to understand the logical statements. ➢ Students will able to work with mathematical problems.

Course code 22BCAAP3	Allied Practical - IIA	T/P	C	H/W
	Excel & C++ Lab for Discrete Mathematics	**P**	**2**	**2**

Objectives	➢ To impart the knowledge about solving Logical problems ➢ To make Students to learn about implementing mathematical structures.

1. Create a truth table using spreadsheet for AND, OR and NOT functions.
2. Create a truth table using spreadsheet for XOR of two variables, using your spreadsheet's AND, OR, and NOT functions to calculate the truth value.
3. Create a truth table, using your spreadsheet's logical functions, for the expression:
   ((P ∧7Q**)** ∨ **(**7P ∧Q).
4. Create a truth table using your spreadsheet for demorgan's theorem.
5. Create a truth table using spreadsheet to check whether the given expression is tautology or not
   (P ∧Q) ∨ **(**7P ∧Q) ∨ **(**P∧7Q) ∨ **(**7P ∧7Q)
6. Write a C++ Program to implement various set operations (union, intersection, difference, symmetric difference).
7. Write a C++ Program to find power set of a set with size n.
8. Write a C++ program to perform following operation: a) is the given relation is reflexive? b) is the given relation is symmetric? c) is the given relation is Transitive?
9. Write C++ Program to implement Prim's Algorithm.
10. Write a C++ Program to check whether a given graph is bipartite or not.

Reference and Textbooks:

Venkataraman, M.K., Sridharan, N., & Chandrasekaran, N. *Discrete Mathematics.* National Publishing co.

Jean-Paul Trembly, & Manohar, R. (2017). *Discrete Mathematics Structures with Applications to Computer Science*. Tata Mc Graw-Hill.

Outcomes	➢ Students will able to understand the logical statements ➢ Students will able to work with mathematical problems..

Course code	Allied Theory - IIB	T/P	C	H/W
22BCAA4	**Computer-Oriented Statistical Methods**	**T**	**3**	**3**
Objectives	➢ Provide knowledge of various significant and fundamental concepts to inculcate in the students an adequate understanding of the application of Statistical Methods. ➢ Obtain an intuitive and working understanding of Statistical analysis.			
Unit -I	**Measures of Central Tendency:-** Arithmetic mean, The Arithmetic Mean Computed from Grouped Data-Median, Mode, Empirical Relation between the Mean, Median, and Mode, Geometric Mean, Harmonic Mean, The Relation between the Arithmetic, Geometric and Harmonic Means, Quartiles, Deciles, and Percentiles, Software, and Measures of Central Tendency. **Measures of Dispersion:-** Dispersion or Variation, Range, Mean Deviation, Semi-Interquartile Range, The 10-90 Percentile Range, Standard Deviation-properties and short methods, The Variance, Charlie's Check, Sheppard's Correction for Variance, Empirical Relations between Measures of Dispersion, Absolute, and Relative Dispersion; Coefficient of Variation, Standardized Variable; Standard Scores, Software, and Measures of Dispersion.			
Unit-II	**Probability:-** Definitions of Probability, Conditional Probability; Independent and Dependent Events, Mutually Exclusive and Events, Probability Distributions, Mathematical Expectation. Sample Space, Events, Counting sample points, probability of events, additive rules, conditional probability, Bayes Theorem. **Sampling Theory:-** Sampling Theory, Random Samples and Random Numbers Sampling with and Without Replacement, Sampling Distributions, Sampling Distribution of Means, Sampling Distribution of Proportions, Sampling Distributions of Differences and Sums, Standard Errors, Software Demonstration of Elementary Sampling Theory.			
Unit-III	**Estimation Theory:-** Estimation of Parameters, Unbiased Estimates, Efficient Estimates, Point Estimates, and Interval Estimates; Their Reliability, Confidence-Interval Estimates of Population Parameters, Probable Error. **Mathematical Expectation:-** Mean of a Random Variable, Variance and covariance of a random variable, Chebyshev's theorem. **Decision Theory:-** Statistical Hypotheses, Tests of Hypotheses and Significance, Type I and Type II Errors, Level of Significance, Normal Distributions, Two-Tailed and One-Tailed Tests, Special Tests, Operating-Characteristic Curves; the Power of a Test, p-Values for Hypotheses Tests.			
Unit-IV	**Discrete probability distribution function:-** Introduction and motivation, binomial and multinomial distribution, Poisson distribution. **Continuous probability distribution function:-** Small Samples, Student's t Distribution, Confidence Intervals, Tests of Hypotheses and Significance, The Chi-Square Distribution, Confidence Intervals for Sigma, Degrees of Freedom, The F			

	Distribution. Observed and Theoretical Frequencies, Definition of chi-square, Significance Tests, The Chi-Square Test for Goodness of Fit, Contingency Tables.
Unit-V	**Simple Linear Regression and correlation:-** Introduction to Linear Regression, the Simple Linear Regression Model, Least Squares and the Fitted Model, Properties of the Least-Squares Estimators, Inference Concerning the Regression Coefficients, Predictions, Choice of a Regression Model. **Multiple linear regression and certain nonlinear regression models:** Introduction, Estimating the Coefficients, Linear Regression Models using Matrices, Properties of the Least Square Estimators, Inferences in Multiple Linear Regression.

Reference and Textbooks:

Goyal, M. (2008). *Computer-based Numerical & Statistical Techniques*. Laxmi Publications, Ltd.

Gupta, S. C., & Kapoor, V. K. (2020). *Fundamentals of Mathematical*. Sultan Chand Statistics & Sons.

Walpole, R. E., Myers, R. H., Myers, S. L., & Ye, K. (1993). *Probability and Statistics for Engineers and Scientists* (Vol. 5). New York: Macmillan.

Outcomes	➢ Understanding and learning statistical methods for computer analysis. ➢ Learning of application of Statistical methods.

Course code	Allied Practical - IIB	T/P	C	H/W
22BCAAP4	**Computer-Oriented Statistical Methods Lab**	**P**	**2**	**2**

Objectives	➢ To introduce the student to basic statistical methods for the analysis of significance differences in data using C++ programming Language through Excel. ➢ To introduce various statistical method such as regression, Skewness, etc.

1. Using C++ execute the basic commands, array, list, and frames.
2. Create a Matrix using C++ and Perform the operations addition, inverse, transpose, and multiplication operations.
3. Using C++ Execute the statistical functions: mean, median, mode, quartiles, range, interquartile range histogram.
4. Using C++ Execute the statistical functions: Standard Deviation,
5. Using C++ import the data from Excel / .CSV file and calculate the standard deviation, variance, and covariance.
6. Using C++ import the data from Excel / .CSV file and draw the skewness.
7. Using C++Import the data from Excel / .CSV and perform the hypothetical testing.
8. Using C++ Import the data from Excel / .CSV and perform the Chi-squared Test.
9. Using C++ perform the binomial and normal distribution on the data.
10. Perform the Linear Regression using C++.
11. Compute the Least squares means using C++.
12. Compute the Multi Regression using C++.

Reference and Textbooks:

Goyal, M. (2008). *Computer-based Numerical & Statistical Techniques*. Laxmi Publications, Ltd.

Gupta, S. C., & Kapoor, V. K. (2020). *Fundamentals of Mathematical*. Sultan Chand statistics & Sons.

Walpole, R. E., Myers, R. H., Myers, S. L., & Ye, K. (1993). *Probability and Statistics for Engineers and Scientists* (Vol. 5). New York: Mac-millan.

Outcomes	➢ Students will able to understand statistical methods for computer analysis. ➢ Students will able to programming with application of Statistical methods.

Course code 22BITA1	Allied-I A	T/P	C	H/W
	FUNDAMENTALS OF COMPUTER	T	3	3

Objectives	➢ To acquire the basic concepts of computer ➢ To gain knowledge about storage devices, computer applications
Unit -I	**Introduction to Computer**: Introduction - Digital and Analog Computers - Characteristics of Computer - History of Computer - Generations of Computer - Classification of Computer - The Computer System - Application of Computers - **The Computer System Hardware**: Introduction - Central Processing Unit - Memory Unit - Instruction Format - Instruction Set - Instruction Cycle – Microprocessor - Interconnecting the Units of a Computer - Performance of a Computer - Inside a Computer Cabinet.
Unit-II	**Computer Memory**: Introduction - Memory Representation - Memory Hierarchy - CPU Registers - Cache Memory - Primary Memory - Secondary Memory - Access Types of Storage Devices - Magnetic Tape - Magnetic Disk - Optical Disk - Magneto-Optical Disk - Using the Computer Memory.
Unit -III	Data Entry Devices - Source Data Entry Devices - Output Devices - I/O Port - Working of I/O System**- Interaction of User and Computer**: Introduction - Types of Software - System Software - Application Software - Software Acquisition.
Unit -IV	**Operating System**: Introduction - Objectives of Operating System - Types of OS - Functions of OS - Process Management - Memory Management - File Management - Device Management - Protection and Security - User Interface - MS-DOS - Windows Family of OS - Brief History of Windows OS - Linux OS - **Computer Programming Fundamentals**: Introduction - Program Development Life Cycle – Algorithm - Control Structures - Flowchart - Pseudo Code - Programming Paradigms.
Unit -V	The Internet and Internet Services : Introduction - History of Internet - Internetworking Protocol - The Internet Architecture - Managing the Internet - Connecting to Internet - Internet Connections - Internet Address - Internet Services - Uses of Internet.

Text Book:

"Computer Fundamentals", Anita Goel, Pearson Education.

References:

Computer Fundamentals By Anita Goel, Pearon Education India ,2010.

Outcomes	• Students will able to understand the basic concepts of computer • Students will able to learn about memory devices and computer applications.

Course code 22BITAP1	Allied-I A	T/P	C	H/W
	FUNDAMENTALS OF OPERATING SYSTEM LAB	P	2	2

Objectives

To make the students understand DOS, UNIX and WINDOWS operating system commands and effectively use the computer interacting with the OS shell.

Cycle-I

Disk Operating System (DOS)

1. Perform the following operations using DOS commands: Change the system date, Change the System time, clear the screen and use the copy con file to create a text file.
2. Demonstrate the following using DOS commands: Change the drive to user working Drive, Display all the files from the drive, Display the Directory names, Display the file types .C, Display the files with attributes(hidden, read-only, system)
3. Create a batch file to do the following: Display the files in a directory with alphabetical order, print the current path of the directory, Display the "Welcome" message, Display the files starting with character 'd', Display the files having names with two characters and file type .C and execute the crated batch file.
4. Create batch file to do the following: Display the current working directory, Create a new directory called "Student", Change the directory to newly created directory, Create two text files namely "user1" and "user2", Rename the file "user1" to your name, Display the files with its attributes, Remove the newly created directory "Student".
5. Demonstrate the following DOS commands: Display all files with extension .txt, Create three text files, Display the content of the text files one by one, Concatenate the three text files into one called "result.txt", Rename the file "result.txt" to "NewName.txt", Display the directory files by its creation date.
6. Demonstrate the following DOS commands: Display the files from the current directory, create a new directory called "New", Copy all the .C files to the newly created directory, change to the new directory, Display all the files from the New directory, Remove the New Directory.
7. Demonstrate the following DOS commands: Display the files starting with 's' and ending with 't', Display files exactly three character in its name, Display the files with any name and extension .exe, Store all the current directory files to a file called "output.txt", Sort and display the contents of the file "output.txt".

Linux Operating System

1. Write a shell script to get the current date, time, username and current working directory.
2. Write a shell script that adds an extension ".new" to all the files in a directory.
3. Write a shell program to reverse the digits of five digit integer
4. Write shell program to find the number of characters, words and line in a given file.
5. Write a shell script to delete the lines containing a word <dd> if it appears between the 5th and 7th position?
6. Write a shell script to get the total count of the word "Linux" in all the ".txt" files
7. Write a shell script to do the following: displays present working directory, displays

	current date and time, lists files in the current directory, creates a directory called test, copies file1 to test directory, renames file1 to file2, displays contents of File2, lists files in the long format. **Windows Operating System** 1. Change the appearance of the windows desktop with new wallpaper and Display settings. 2. Use the control panel to change the system date and time 3. Using the windows folder to do the following: search and display the selected files from the folder, Display the files with the extension .C, Delete all the files with the extension .BAK 4. Do the following operations on folders and files: create a new folder, change to the new folder, create some text files on the folder, rename any one of the file to "reNamedFile", Delete the file just renamed, Remove the new folder created by you. 5. Demonstrate the following: Create a new text file using any text editor, Display the text file on the folder, Change the file attributes to read-only and hidden, Remove the file created by you.
Reference and Textbooks:- DOS: The Complete Reference Paperback, Kris Jamsa, 4th Edition, McGraw Hill 1993. Linux: The Complete Reference, Sixth Edition – Illustrated, Richard Petersen,McGraw Hill, 2008. Windows 10: The Missing Manual, 2nd Edition, David Pogue, O'Reilly Media, Inc., 2018.	
Outcomes	➢ Understand the commands and services in operating systems. ➢ Develop solutions for a range of problems by writing scripts. ➢ Automation of oft-repeated operations with scripts and short cuts

Course code 22BITA2	Allied-I B	T/P	C	H/W
	DIGITAL ELECTRONICS	**T**	**3**	**3**
Objectives	➢ To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits. ➢ To impart how to design Digital Circuits.			
Unit -I	**Digital Logic**: The Basic Gates-NOT, OR, AND – Universal Logic Gates - NOR, NAND – And - OR Invert Gates – Positive Negative Logic – **Data Processing Circuits**: Multiplexers – Demultiplexers – 1 to 16 Decoder – BCD To Decimal Decoders – Seven Segment Decoders.			
Unit-II	Encoders – Exclusive OR Gates – Parity Generator Checkers – Read Only Memory – Programmable Array Logic – **Number Systems and Codes**: Binary Number system – Radix Representation of Numbers - Binary to Decimal Conversion – Fixed Point Representation - Decimal to Binary Conversion – Octal Numbers – Hexadecimal Numbers – The ASCII Code – The Excess-3 Code – The Gray Code.			
Unit -III	**Arithmetic Circuits**: Binary Addition – Binary Subtraction – Unsigned Binary Numbers – Sign-Magnitude Numbers – 2's Complement Representation – 2's Complement Arithmetic – Arithmetic Building Blocks – The Adder - Subtractor – Fast Adder – Arithmetic Logic Unit – Binary Multiplication and Division.			
Unit -IV	**Clocks and Timers**: Clock Waveforms – TTL Clock – Schmitt Trigger - 555 Timer Astable – 555 Time Monostable – Monostables with Input Logic - **Flip-Flops** : RS Flip-Flops – Gated RS Flip-Flops – Edge-Triggered RS Flip-Flops - Edge-Triggered D Flip-Flops – Edge-Triggered JK Flip-Flops - Flip-Flop Timing – JK Master-Slave Flip-Flops.			
Unit -V	**Registers**: Types of Registers – Serial In-Serial Out – Serial In-Parallel Out – Parallel In-Serial Out – Parallel In-Parallel Out – Universal Shift Register – **Counters**: Asynchronous Counters - Decoding Gates – Synchronous Counters – Decade Counters – Presettable Counters - A Digital Clock.			

Text Book:

"*Digital Principles and Applications",* Donald P. Leach, Albert Paul Malvino, Goutam Saha , Eighth Edition, McGraw-Hill International Editions.

Books for Reference:

S.Salivahanan and S.Arivazahagan. "*Digital circuits and design",* Vikas publishing house Ltd., 2000.

Tocci T.I "D*igital systems: principle and applications",* sixth edition, PHI 1997.

Mano M.M, "*Digital logic and complete design*" PHI 1992.

Palmer, J.E and Periman, D.E, "*Introduction to Digital systems*"

Outcomes	• Students will able to understand the basic concepts of Digital Electronics • Students will able to design circuits and how to implement.

Course code 22BITAP2	Allied-I B	T/P	C	H/W
	DIGITAL ELECTRONICS LAB	P	2	2

Objectives	• To Understand the Digital Electronics Practically • To know how to solve gates and other functions.

1. AND, OR and NOT Gate using Truth Table
2. Universality of NAND & NOR gates.
3. Verification of Boolean laws using NAND gates (Associative, Commutative & Distributive Laws)
4. Verification of Boolean laws using NOR gates (Associative, Commutative & Distributive Laws)
5. Sum of Products using NAND gates and Product of Sums using NOR Gates.
6. 4-bit binary parallel adder and Subtractor IC 7483
7. Counter using IC 7473
8. Study of RS, D, T and JK Flip-Flops with IC's.
9. Study of Encoder & Decoder.
10. Study of Multiplexer & De-Multiplexer.
11. Half and Full Adder using Simple & NAND Gates.
12. Half and Full Subtractor using Simple & NAND Gates.

Outcomes	• Students were able to solve simple gate functions. • Students were able to solve and Design circuits using IC.

Course code 22BITA3	Allied	T/P	C	H/W
	Multimedia and Its Applications	**T**	**3**	**3**

Objectives	➢ This course gives an exposure to Multimedia and its applications. ➢ Students will understand the hardware and software needed to create application using creativity
Unit -I	Multimedia Definitions – Delivering - Uses of multimedia. Text : The Power of Meaning – About Fonts and Faces –Using Text in Multimedia – Computers and Text – Font Editing and Design Tools – Hypermedia and Hypertext.
Unit-II	Images: Making Still Images –Understating natural light and color- Image File formats. Sound: The Power of Sound – Multimedia System Sounds- Digital Audio - MIDI Versus Digital Audio — Making MIDI Audio – Audio file formats – Adding Sound– Copyright Issues.
Unit -III	Animation: The Power of motion – Principles of Animation - Making Animation. Video : Using video – How it works – Broadcast Video Standards – Integrating Computers and Television – shooting and Editing Video – Video Tips – Recording Formats – Digital video.
Unit -IV	Making Multimedia- Hardware Peripherals: Connection- Memory and storage Devices – Input / Output Devices-Communication Devices Software-Editing tools for Text, Image, Sound, Animation and Video Multimedia Skills-Designing for the World Wide Web.
Unit -V	Adobe Animate: Animate Interface-Managing workspaces and Panels Customizing the tools and Timeline panels- Animating with Diverse Techniques-Working with Shapes-Tweens-Symbols-Interactive Motion Graphics for the Web-Character design through Layer.

Reference and Text Books:

- Multimedia: Making It Work-Ninth Edition-Tay Vaughan-McGraw Hill
- Mastering Adobe Animate 2021-Joseph Labrecque - Packt Publishing Limited
- Multimedia Application and Web Designing - Dinesh Maidasani- Laxmi Publications
- Multimedia Programming: A Practical Approach- Dr. Siddhartha Bhattacharyya & Dr. Paramartha Dutta - Vikas Publishing

Outcomes	➢ Understand the concepts of Sound, Image, Animation and Video. ➢ Work with Animation tools.

Course code 22BITAP3	Allied-II A	T/P	C	H/W
	Multimedia LAB	P	2	2

LIST OF PRACTICAL PROGRAM
Note : Use Adobe Animate Latest Software

1. Draw an animation to show a bouncing ball.
2. Draw an animation to show a moving stick man.
3. Draw an animation with banana.
4. Draw an animation to show sunrise and sunset.
5. Draw an animation to show a disappearing house.
6. Draw an animation to show two boats sailing in river
7. Draw an animation to show a scene of cricket match.
8. Draw an animation to help teach a poem or a song
9. Draw an animation to show cartoon with a message
10. Draw an animation to move Butterfly from one flower to other.
11. Draw an animation for health tips.
12. Draw an animation for Kids Mathematics.
13. Make a movie showing Shape Tweening.
14. Make a movie showing Motion Tweening.
15. Add sound and button to the movie.

Course code 22BITA4	Allied-II B	T/P	C	H/W
	Open Source Technologies	**T**	**3**	**3**

Objectives	➢ Learn more server side scripting. ➢ To understand Python programs with lists, tuples, sets and dictionaries.
Unit -I	Introduction to Open sources-Need of Open Sources-Advantages of Open Sources – Application of Open Sources. Introduction to PHP: Evaluation of PHP, Basic Syntax, Defining variable and constant, PHP Data type, Operator and Expression. Introduction to Control Structures – Using Conditional and Looping Statements. Handling Html Form with PHP- Capturing Form, GET- POST method and redirecting a form after submission.
Unit-II	Array: Anatomy of an Array, Creating index based and Associative array, Accessing array, Looping with Index based array, Looping with associative array using foreach(). String: String Searching & Replacing String, Formatting String, String Related Library function and regular expression.
Unit -III	Function: What is a function, Define a function, Call by value and Call by reference, Recursive function, Date and Time Function. Working with file and Directories: Understanding file & directory, Opening and closing a file, Copying, renaming and deleting a file, working with directories, Creating and deleting folder, Exception Handling: Understanding Exception and error, Try, catch, throw. Error tracking and debugging. Sending and receiving E-mails
Unit -IV	Introduction to Python: History of Python- Futures of Python-Application of Python Installation of Python-Keywords-Identifiers-Statements-Indentation-Data types-Literal Variable-Operators and Expression-Input/Output Statements. Conditional and Looping Statements. Sequences–Lists-Methods--Mutability-Creating Tuple- Accessing / Updating / Deleting elements in Tuple-Nested Tuples–Making a Dictionary-Adding and Modifying an Item in a Dictionary-Sorting Items-Looping over a Dictionary- Sets-Iterators and Generators.
Unit -V	Functions-Defining a Function-Calling Function – Type of Arguments –return statement - Recursive functions-Modules- Installing Packages. Strings and Regular Expressions-Files and Directory Access-Opening a file modes-Reading / Writing Operations on a File-File Position-Renaming and Deleting File-Object Oriented Programming-Errors and Exceptions- Handling Exceptions

Text Book:

PHP: The Complete Reference -Steven Holzner -McGraw Hill Education-2017

PHP Programming -The Complete Guide - Code Academy-2022

Python Programming- Ch Satyanarayana, M Radhika Mani, B N Jagadesh -Universities Press.

Python Programming Using Problem Solving Approach - Reema Thareja-Oxford University Press.

Outcomes	• Understand process of executing a PHP-based script on a webserver. • Explain the various operations for manipulating Tuples, Sets, Dictionaries and use List to perform simple and sorting operations.

Course code 22BITAP4	Allied	T/P	C	H/W
	Open Source Lab	P	2	2

1. Write a PHP Program to create a page using functions for comparing three integers and print the largest number.
2. Write a PHP Program to calculate the factorial of a number (non-negative integer). The function accept the number as an argument.
3. Write a PHP Program to convert Number into Word.
4. Write a PHP Program to check whether the given number is prime or not.
5. Write a PHP Program that checks whether a passed string is palindrome or not.
6. Write a PHP Program to prepare the EB Bill using File Handling.
7. Write a PHP program to check the email-id is valid or not using regular expression
8. Write a Python Program for checking whether the given number is an odd or even number.
9. Write a Python Program to check leap year.
10. Write a Python Program to Check Prime Number.
11. Write a Python program to check whether the given no is Armstrong or not.
12. Write a Python program to generate list of Fibonacci number up to n Fibonacci numbers.
13. Write a python program to create, append and remove lists in python.
14. Write a program to demonstrate working with tuples in python.
15. Write a program to demonstrate working with dictionaries in python.
16. Write a python program to define a module to find Factorial Numbers and import the module to another program.
17. Write a Python program to find the given string is Palindrome or Not.
18. Write a python program by using exception handling mechanism.

Course code: 22BSOA1	Allied- IA	T/P	C	H/W
	Office Automation	**T**	**3**	**3**

Objectives	➢ To learn the office software suite and do basic operations on documents ➢ To learn formatting features of Word package and design page layout, tables and news columns ➢ To learn the Excel package and create worksheets, workbooks, formulas to fill the data automatically, draw charts from data and perform what-if analysis. ➢ To learn Access package and design database elements Table, Query, Form, Reports and manipulate them. ➢ To learn powerpoint package and make presentation slides with various layouts, formats and animations.
Unit -I	MS Word Exploring Word 2007: Working in the Word Environment – Opening, Moving Around in, and closing Document – Creating and Saving A Document – Previewing and Printing Document – Editing and Proofreading Documents: Making Changes to document – Inserting Saved Text – Finding the Most Appropriate Word – Reorganizing a Document Outline – Finding and Replacing Text – Correcting spelling and Grammatical errors – Finalizing Document.
Unit-II	MS Word Changing the Look of Text: Quickly Formatting Text and Paragraphs – Manually changing the look of characters – Manually changing the look of paragraphs – Creating and modifying Lists-Presenting Information in Columns and Tables : Presenting Information in Columns – Creating Tabular List – Presenting Information in a Table – Formatting Table Information – Performing Calculations in a Table- Using a Table to control Page Layout.
Unit -III	MS Excel Setting Up a Workbook : Creating Workbooks – Modifying Workbooks - Modifying Worksheets – Working with Data and Data Tables : Entering and Revising Data – Moving Data within a Workbook- Finding and Replacing Data – Correcting and Expanding Upon Worksheet Data – Defining a Table – Performing Calculations on Data : Naming Groups of Data – Creating Formulas to Calculate Values – Summarizing Data that meets Specific Conditions – Finding and Correcting Errors in Calculations- Changing Document Appearance.
Unit- IV	MS-Access: Introduction – Parts of an Window: - Creating a New Data Base – Table Wizard – Renaming – Saving the Database – Relationships – Query – Form – Reports – Exiting MS-Access.
Unit- V	MS PowerPoint Starting a New Presentation – Working with Slide Text : Entering Text – Editing Text – Adding and Manipulating Text Boxes –Correcting and Sizing text – Checking Spelling – Finding and replacing text and fonts – Changing the size, Alignment, Spacing – Adjusting the Slide Layout, Order and Look : Changing the Layout of a slide – Rearranging Slides in a Presentation – Applying a theme -Switching to a Different Color Scheme – Adding Shading and texture to the background of a slide – Delivering a Presentation Electronically.

Text Book:

Joyce Cox and Team, 2009 *Step by Step 2007 Microsoft Office System*,PHI learning Private ltd, New Delhi.

Reference Book:

Sanjay Saxena, 2006 *MS-Office 2000 for everyone*‖, Vikas Publishing House Pvt. Ltd, Reprint.

Outcomes	➢ To be able to create documents in office packages, store and retrieve them. ➢ To be able to design letters, reports, books, wrapper pages and perform spelling and grammar check. ➢ To be able to create workbooks for business applications and perform powerful what-if analysis on data by grouping and classifying them. ➢ To be able to create and maintain database for any applications and design colorful forms and reports based on user-defined queries. ➢ To be able to make colorful presentations for education/business/meetings with powerpoint slides.

Course code: 22BSOAP1	Allied Practical-IA	T/P	C	H/W
	Office Automation Lab	T	2	2

Objectives

- To create letter, report, book chapters, news columns and wrappers using word package.
- To create production letters by merging data from data source with main document for mass communication
- To create excel worksheet with data for the given problem and autofill formulae, perform what-if analysis and draw charts.
- To create database for the given application, add query, form and report and make it as a full-fledged database system.
- To create powerpoint presentation with colourful slides for the given application

MS - WORD

1. Preparing an Official Letter / Business Letter / Circular Letter Covering formatting commands - font size and styles - bold, underline, upper case, lower case, superscript, subscript, indenting paragraphs, spacing between lines and characters, tab settings etc.,
2. Preparing a newsletter: To prepare a newsletter with borders, two columns text, header and footer and inserting a graphic image and page layout.
3. Creating and editing the table to create a table using table menu, to create a monthly calendar using cell editing operations like inserting, joining, deleting, splitting and merging cells, to create a simple statement for math calculations viz. Totalling the column.
4. Creating numbered lists and bulleted lists to create numbered list with different formats (with numbers, alphabets, roman letters), to create a bulleted list with different bullet characters.
5. Printing envelopes and mail merge, to print envelopes with from addresses and to addresses, to use mail merge facility for sending a circular letter to many persons, to use mail merge facility for printing mailing labels.
6. Using the special features of word to find and replace the text, to spell check and correct, to generate table of contents for a document.

MS - EXCEL

7. Using formulas and functions: To prepare a Worksheet showing the monthly sales of a company in different branch offices (Showing Total Sales, Average Sales).
8. Creating a Chart: To create a chart for comparing the monthly sales of a company in different branch offices.
9. Sorting Data, Filtering Data and creation of Pivot tables.
10. Create a sales table using the following data :

Item	Year1	Year2	Year3	Year4
Rice	1000	1050	1100	1200
Sugar	950	1050	1150	1200
Dal	1100	1200	1200	1300

a. Draw the bar graph to compare the sales of the three items for four years.
b. Draw a line graph to compare the sales of three items for four years using insert option.
c. Use condition, to highlight all the cells having value >=1000 with red color (Use conditional formatting).

MS - POWERPOINT

11. Creating a new presentation based on a template – Using Auto content wizard, design template and plain blank presentation.
12. Creating a presentation with slide transition – Automatic and Manual with different effects.
13. Creating a presentation applying custom animation effects – applying multiple effects to the same object and changing to a different effect and removing effects.
14. Creating and printing handouts.

MS - ACCESS

15. Create a database “Student” with
    a. At least one table named “Mark Sheet” with field name “Student Name, Roll Number, Mark1, Mark2, Mark3, Mark4, Total”
    b. The data types are, Student Name : text, Roll Number : number, Mark1 to Mark4 : number, Total : number. Make Roll Number the primary key.
    c. Enter data in the table. The total must be calculated using update query.
    d. Use query for sorting the table according to the descending/ascending order of the total marks.
16. In addition to the table above,
    a. Add an additional field “Result” to the “Mark Sheet” table.
    b. Enter data for at least 10 students.
    c. Calculate the result for all the students using update query. (If total > = 200, then pass, else fail).
    d. Search the students, whose name starts with “An”.
    e. Show the names and total marks of the students who have passed the examination.

Reference and Textbooks:-

Joyce Cox and Team, 2009 *Step by Step 2007 Microsoft Office System*, PHI learning Private ltd, New Delhi.

Sanjay Saxena, 2006 *MS-Office 2000 for everyone*‖, Vikas Publishing House Pvt. Ltd, Reprint.

Outcomes	➢ To be able to open, Save and close and integrate the documents from other packages. ➢ To be able to format text in word documents, design layouts and preview or print them. ➢ To be able to create worksheets with data for the given application and generate statistical reports and summary of data for what-if analysis. ➢ To be able to design data tables and manipulate them according to user requirements. ➢ To be able to create colourful presentations in different layouts, slide designs and with animations.

Course code: 22BSOA2	Allied- IB	T/P	C	H/W
	PROGRAMMING IN C	**T**	**3**	**3**

Objectives	➢ To learn the fundamentals of computer programming ➢ To learn the use of operators and statements in C language ➢ To learn the ways to write user defined functions, arrays and string data. ➢ To get know-how knowledge on pointers, structures and union features in C ➢ To learn the importance of file storage and create simple data files.
Unit -I	**Overview of C:** Introduction to algorithm, flowchart, structured programming concept, programs – Compiler, Interpreter. Introduction to C Language: The C character set, identifiers and keywords, data types, constants, variables and arrays, declarations, expressions, statements, type conversion, symbolic constants.
Unit-II	**Operators, I/O functions and Control Structures in C** **Operators and expressions**: Arithmetic operators, unary operator, relational and logical operator, assignment operators, the conditional operator, type conversion, Library function. **Data input and output**: Single character input, single character output, scanf, printf, puts gets functions, interactive programming. **Control statement**: Branching: if else statement, Looping, nested control structure, switch statement, jumping statements.
Unit- III	**Functions**: Overview, function prototypes, passing arguments to a function, recursion. **Arrays**: Defining an array, passing array to functions, multidimensional arrays, **strings**: one dimensional character array, array of strings.
Unit- IV	**Pointers**: Fundamentals, passing pointers to a function, pointers and one dimensional arrays, dynamic memory allocation, operation on pointers, pointer to an array, pointer to string, pointer to structure, pointers to function, array of pointers. **Structures and unions**: Defining a structure, processing a structure, user defined data types, structure and pointers, passing structure to function, self-referential structures, and union.
Unit -V	**Data files:** opening and closing a data file, File Management Functions, reading and writing a data file, processing a data file, and unformatted data file, concept of binary file, Random access.

Reference and Textbooks:-(APA Format)

Brian W Kernighan & Dennis Ritchie, 2001 *The c programming language,* IInd edition Eastern Economy Edition, Prentice Hall

Byron S Gottfried, 2010 *Programming with C*, Schaum's outlines 2nd Edition.

Forouzan, 2007 *Computer Science: A Structured Programming Approach Using C*, 3rd Cengage Learning

PradipDey, ManasGhosh,2007 *Programming in C*, Oxford Higher Education

YashavantKanetkar,2008 *Working with C*, BPB publication

Outcomes	➢ To be able to understand the structured programming concepts, Tokens and Use of different Data types in a computer program. ➢ To be able to use Operators, Input and Output functions and Control Structures in C Programs ➢ To be able to write programs to solve simple programs involving few input data using single, Multi dimensional Arrays and Functions, ➢ To become familiar with Structures and Unions in grouping data in user-defined ways. ➢ To be able to write programs to get data from user and store in files.

Course code: 22BSOAP2	Allied Practical-I B	T/P	C	H/W
	Programming in C Lab	**T**	**2**	**2**

Objectives

- To learn the basics of C programming language and write solution to a problem by writing a C program.
- To learn the use of various operators and control statements in C to solve problems.
- To learn the use of array data structure to group homogeneous data together and process them.
- To learn how to create user defined functions, pointers and use them in solving problems
- To learn how to create and manipulate data files using C program.

1. Implementation of the various Data Types in C.
2. Demonstration of for loop.
3. Demonstration of do...while loop.
4. Demonstration of while loop.
5. Demonstration of nested if (Hint: Use logical operators).
6. Demonstration of switch... case structure.
7. Implementation of arrays.
8. Implementation of multidimensional arrays (Hint: implement matrix operation).
9. Implementation of functions (Hint: Demonstrate call by value, call by reference).
10. Demonstration of various string operations (Hint: Usage of user defined functions only allowed).
11. Demonstration of pointer operations.
12. Demonstration of recursion (Hint: GCD, factorial, Fibonacci series).
13. Implementation of structures (Hint: simple structure operations, array of structures).
14. Implementation of pointers to structures.
15. Demonstration of dynamic allocation of memory (Hint: malloc, calloc, realloc, free).
16. Demonstration of various file operations on different types of files.

Reference and Textbooks:-(APA Format)

Brian W Kernighan & Dennis Ritchie, 2001 *The c programming language*, IInd edition Eastern Economy Edition, Prentice Hall.

Byron S Gottfried, 2010 *Programming with C*, Schaum's outlines 2nd Edition.

Forouzan, 2007 *Computer Science: A Structured Programming Approach Using C*, 3rd Cengage Learning

PradipDey, ManasGhosh, ,2007 *Programming in C*, Oxford Higher Education.

Outcomes

- Understand basic structure of C program and concepts in problem solving.
- Design solution procedures to solve simple problems
- Design solution procedures to solve complex problems using control statements and loops.
- Use pointers in programs instead of arrays in order to use computer's memory economically.
- Create and manipulate files for permanent storage and retrieval of data.

Course code: 22BSOA3	Allied-II A	T/P	C	H/W
	Electronic Publishing	**T**	**3**	**3**

Objectives	➢ To understand the building blocks of desktop publishing using Page Maker and Photoshop packages. ➢ To understand the layers and tools in photoshop for photo editing ➢ To understand the basic features of PageMaker ➢ To understand various formatting features of PageMaker ➢ To understand graphics handling features of PageMaker
Unit -I	**Getting Started with Photoshop:** Exploring the Toolbox - The New CS4 Applications -Bar & the Options Bar - Exploring Panels & Menus - Creating & Viewing a New – Document - Customizing the Interface - Setting Preferences. Working with images: Introduction - Making Selections – Resizing & Cropping Images.
Unit-II	**Getting Started with Layers**: Layers Palette – Working with Layers – Hiding/Showing Layers – Flattening Images – Working with Adjustment Layers – Layer Effects. Painting in Photoshop – Photo Retouching. **Type**: Creating Type – Type Tool – Moving the Text – Creating Paragraph Type. **Filters:** The Filter Menu – Filter Gallery – Filter Effects – Lighting Effects.
Unit III	**Getting started with Page maker:** PageMaker Basics - Starting PageMaker - About the work area - Using the toolbox - working with palettes - Viewing pages - Working with text and graphics - Moving between pages, adding and deleting pages - Working with multiple open publications.
Unit IV	**Drawing tools and text tools:** Different drawing tools - Text tools - Character formatting, paragraph formatting - Controlling windows and orphans - Controlling page breaks, tabs and hyphenation - Grid manager - Printing a document.
Unit V	**Importing Graphics**: Placing graphics - Sizing and cropping graphics – OLE - Embedding an OLE object. **Master Pages:** Creating a master page - Numbering pages - Setting up ruler guides - Applying master page design.

Reference and Text Books:

Adele Droblas Greenberg, Seth Greenberg, 2001 *The Complete Reference Photoshop 6*, McGraw-Hill Education

Carolyn M. Connally, 2002*PageMaker 7 The Complete Reference*, Osborne/McGraw- Hill.

David Xenakis Benjamin Levisay, 2001 *Photoshop 6 in Depth*, 1st Edition, Paraglyph Press.

Ramesh Bangia, 2015 *Learning Page maker 7*. First edition, Khanna Book Publishing Company.

Satish Jain, *PageMaker 7, Training Guide*, BPB Publications

Outcomes	➢ To be able to edit and enhance pictures in photoshop for better display and printing ➢ To be able to use layers effectively to place multiple content with transparency ➢ To be able to edit and create pages in book chapter or advertisement using PageMaker ➢ To be able to use text and drawing tools on pages ➢ To be able to crop and enhance the features of graphics on pages.

Course code: 22BSOAP3	Allied Practical –II A	T/P	C	H/W
	Electronic Publishing Lab	**P**	**2**	**2**

Objectives

- To learn and use the tools available in Photoshop in enhancing given images
- To learn cropping of images using tools in photoshop
- To learn page design in PageMaker
- To learn designing a book content and its wrapper
- To learn designing columns for paper news

Photoshop

1. Create a Postcard in Photoshop
2. Create a Photo Collage in Photoshop
3. Enhance Images in Photoshop
4. Remove the background of an image in Photoshop
5. Design a Logo for your institution in Photoshop
6. Create a Mirror Image Effect in Photoshop

PageMaker

7. Create a Label using PageMaker
8. Create a Visiting card in PageMaker
9. Create a notice board in PageMaker
10. Design a Wrapper for a Book in PageMaker
11. Design an advertisement for a newspaper in PageMaker

Reference and Textbooks:-(APA Format)

C.J.Date, 1990 "*An Introduction to Data Base Systems*," , Volume L Addison Wesley, Reading, MA

R Elmasri, S B Navathe, 2010 *Fundamentals of Database Systems,* D V L N Somayajulu, S K Gupta, 6th Edition, Pearson Education. (Chapter I,II,III,IV,VIII,IX,X)

H.F. Korth, A Silberschatz and S. Sudarasan, 2010 "*Database System Concepts*", Computer Science Series, McGraw-Hill.

Outcomes

- To be able to process given images and enhance their quality
- To be able to design pages using tools in PageMaker
- To be able to design logo, visiting card, advertisement etc.
- To be able to do full fledged desktop publishing
- To be able to design news paper columns with text and images

Course code: 22BSOA4	Allied- II B	T/P	C	H/W
	Web Design using HTML	**T**	**3**	**3**

Objectives	➢ To learn the history and fundamentals of Hyper Text Markup Language (HTML) ➢ To learn the structure of an HTML document and design a web pages with hyperlinks ➢ To learn to create data in tables and format them suitably ➢ To learn to design data forms with form elements ➢ To learn to specify internal and external style sheets to control the appearance of a web page
Unit -I	HTML-History of HTML- HTML Generation-HTML documents - Anchor tag-Hyperlinks-Sample HTML documents.
Unit-II	Head and body section-Header section-Title-Prologue-Links- Colorful webpage-Comment line-Sample HTML documents-Lists- Ordered lists-Unordered lists-Nested lists.
Unit- III	Creating tables – Aligning Table elements – Working with advanced tables – Creating Frames – Frame concepts.
Unit -IV	Creating Forms – Formatting and Designing forms – Image Maps – Working with image Map region types.
Unit- V	Layers – Positioning a layer – Attaching Scripts to layers – Nesting Layers – Style Sheets – Exploring the properties of a style.

Reference and Textbooks:-(APA Format)

World Wide Web design with HTML : C.Xavier

HTML (With Dynamic HTML) : Vishnu P.Singh

Outcomes	➢ To be able to design simple web pages ➢ To be able to control the design of web pages from different sections of the document ➢ To be able to design table of data and formatting with colors and backgrounds ➢ To be able to create frames to divide the screen into multiple independent sections ➢ To be able to specify and use internal and external style sheets and format web pages with different styles without rewriting code.

Course code: 22BSOAP4	Allied Practical- II B	T/P	C	H/W
	Web Design using HTML Lab	**P**	**2**	**2**

Objectives

- To learn and use HTML tags and design web pages
- To learn text formatting features
- To learn image formatting features
- To learn Table creation and formatting
- To learn Style sheets and Frames for managing screen space.

1. Write a HTML Program to illustrate body and pre tags.
2. Write a HTML Program to illustrate Font tag.
3. Write a HTML Program to illustrate comment,h1….h6, and div tag.
4. Write a HTML Program to illustrate text formatting tags.
5. Write a HTML Program to illustrate Order List tag.
6. Write a HTML Program to illustrate Unordered List tag.
7. Write a HTML Program to illustrate Nested and Definition tag.
8. Write a HTML Program to illustrate Image tag
9. Write a HTML Program to illustrate Hyper Link tag (Anchor tag)
10. Write a HTML Program to illustrate Table tag.
11. Write a HTML Program to illustrate Frame tag.
12. Write a HTML Program to illustrate Form tag.
13. Write a HTML Program to illustrate CSS (cascading style sheet).
14. Write a HTML Program to illustrate Layer.
15. Write a HTML Program to create a Colorful webpage.

Text and Reference Books:

World Wide Web design with HTML : C.Xavier

HTML (With Dynamic HTML) : Vishnu P.Singh

Outcomes

- To be able to design static content web pages
- To be able to design a website containing pages that are linked with other pages and with other websites
- To be able to format background with images
- To be able to specify styles for formatting multiple websites with same formatting features
- To be able to divide the screen into multiple independent frames and load different contents in each frame.

இரண்டாம் ஆண்டு - மூன்றாம் பருவம்				
பாடக்குறியீட்டு எண்: 22NME3A	**பள்ளியில் தமிழ் பயிலாத மாணாக்கர்களுக்கான அடிப்படைத் தமிழ்ப் பாடங்கள்**	T/P	C	H/W
	தமிழ் மொழியின் அடிப்படைகள்	T	2	2

நோக்கம் :	➢ இலக்கணம் அறிந்து கொள்ள வாய்ப்பினை ஏற்படுத்துதல். ➢ தமிழ் மொழியில் பிழையின்றி எழுத அறிந்துகொள்ள வாய்ப்பினை ஏற்படுத்துதல்.
அலகு -1	எழுத்துக்கள் – உயிர் எழுத்துக்கள் – மெய்யெழுத்துக்கள் – உயிர்மெய்யெழுத்துக்கள்
அலகு -2	சொற்களின் வகை அறிதல் – பெயர்ச்சொல் – வினைச்சொல் – இடைச்சொல் – உரிச்சொல்
அலகு-3	எழுத்துக்களின் வேறுபாடு அறிதல்: ணகர, னகர எழுத்துக்கள் சொற்களில் பயின்று வருதல் லகர, ழகர, ளகர வேறுபாடு அறிதல் ரகர, றகர வேறுபாடு அறிதல்.
அலகு -4	எழுத்துக்களின் பிறப்பு – உச்சரிப்புப் பயிற்சி அளித்தல் – பிழையின்றிப் படிப்பதற்குப் பயிற்சி அளித்தல்.
அலகு -5	பிறமொழிச் சொற்களைக் கண்டறிதல் – தமிழ் மாதங்கள் – கிழமைகள் – எண்கள் – சுவைகள் – உறவுப் பெயர்கள் ஆகியவற்றை அறிதல்
பயன்கள்:	➢ அடிப்படை இலக்கணச் சூழலியல் கற்றால் தமிழ் மொழி இலக்கணங்கலை பிறமொழிகளோடு ஒப்பிடும் ஆற்றல் பெறுவர். ➢ அழகியல் உணர்ச்சிகளைப் புரிந்து கொள்ள ஏதுவாக இலக்கணம் இருக்கிறது என்பதை உணர்ந்து தனித்துவம் வாய்ந்தவர்களாக தன்னம்பிக்கைப் பெற்றவர்களாக மாறலாம்.

இரண்டாம் ஆண்டு - மூன்றாம் பருவம்				
பாடக்குறியீட்டு எண்: 22NME3B	பள்ளியில் மேல்நிலைப் படிப்பு வரை தமிழ் பயின்று கல்லூரியில் பகுதி 1– இல் தமிழ் பயிலாத மாணாக்கர்களுக்கான சிறப்புத் தமிழ்ப் பாடங்கள்	T/P	C	H/W
	இக்கால இலக்கியம்	T	2	2

நோக்கம்	➢ கவிதை, சிறுகதை, புதினம், உரைநடை ஆகிய படைப்பியல் வகைகளைப் பற்றிய பரந்துபட்ட புலமையைப் பெருக்குதல். ➢ இக்காலத் தமிழ் இலக்கியங்களின் உள்ளடக்கம், வெளியீட்டு நெறி, படைப்பில் கொள்கை ஆகியவற்றை அறியச் செய்தல்
அலகு1	**கவிதை இலக்கியம்**
அலகு2	1. பாரதியார் – சுதந்திரப் பாடல்கள்: 'சுதந்திரப் பெருமை' என்ற பாடல் முதல் 'சுதந்திரப் பள்ளு' என்ற பாடல் வரை உள்ள 06 பாடல்கள். 2. பாரதிதாசன் – தமிழ் (முதல்தொகுதி) 'தமிழின் இனிமை' என்ற பாடல் முதல் 'தமிழ்க்கனவு' என்ற பாடல் வரை உள்ள 10 பாடல்கள். 3. நாமக்கல் கவிஞர் – காந்தி மலர் : 'காந்தி அஞ்சலி' என்ற பாடல் முதல் 'இணையிலர் காந்தி' என்ற பாடல்வரை உள்ள 6 பாடல்கள். 4. கவிமணி – உடல் நலம் பேணல் 'உடலின் உறுதி உடையவரே' என்ற பாடல் முதல் 'அருமை உடலின் நலமெல்லாம்' என்ற பாடல் வரை உள்ள 8 பாடல்கள் 5. பட்டுக் கோட்டை கல்யாண சுந்தரம் - காடு வெளையட்டும் பொண்ணே 6. கண்ணதாசன்- மனிதரைப் பாட மாட்டேன் (கவிதைகள்) 7. ஜீவா - பெண் விடுதலை 8. அப்துல் ரகுமான் - வீட்டுக்கொரு மரம் (கூடு துறக்கும் பறவை) 9. சண்முகம் சரவணன் - இயல்பாய் நடந்தேறியது
அலகு3	**நாவல் இலக்கியம்** இறையன்பு - ஆத்தங்கரை ஓரம்,
அலகு4	**சிறுகதை இலக்கியம்** 1. வ.வே.சு.ஐயர் - குளத்தங்கரை அரசமரம் 2. அறிஞர் அண்ணா - செவ்வாழை 3. ஜெயகாந்தன் - முன் நிலவும் பின் பனியும் 4. கி. ராஜநாராயணன். - கதவு 5. தனுஷ்கோடி ராமசாமி. - வாழ்க்கை நெருப்பூ 6. சே. செந்தமிழ்ப்பாவை. - வல்லமை தந்துவிட்டாய் 7. கரு. முருகன். - அப்பாவுக்கு காய்ச்சல் 8. சு.காந்திதுரை - துணிக்காரச் சாமி 9. கெண்டக்கரை வேட்டி - பாண்டுரங்கன்

அலகு	**இலக்கணம்** முதல் எழுத்துக்கள் – சார்பெழுத்துக்கள் – மொழி முதல் எழுத்துக்கள் – மொழி இறுதி எழுத்துக்கள் – வல்லினம் மிகும் இடங்கள், மிகா இடங்கள்.
நியூ செஞ்சுரி புக் ஹவுஸ் பிரைவேட் லிமிடெட்.சென்னை - 98.	
பயன்கள்	➢ இலக்கியங்கள் வாயிலாக மாணவர்கள் பல்வகைப்பட்ட சமூகப் போக்குகளையும் மக்களின் பண்பு நலன்களையும் அறிந்து கொள்ள இயலும். ➢ பல வகையான இலக்கிய வாசிப்பின் வாயிலாக மாணவர்கள் தங்களின் படைப்பாற்றல் உள்ளிட்ட பணி நிலைகளுக்கு உயர்வதற்கான வாய்ப்பினைப் பெறுவர்.

Semester III				
Course Code	**NME**	**T/P**	**C**	**H/W**
22NME3C	**IT Skills for Employment (Common to all UG programmes)**	**T**	**2**	**2**

Objectives:

- Understand the components of computer
- Understand Internet and its terminology
- Understand basic cyber safety and security norms

Unit- 1	Introduction to Computers –Types of Computer - Hardware – Motherboard-Processor-RAM –ROM – SMPS – Graphics Card– Storage Devices – Hard Disc – SSD – DVD – CD – Pen drive- – Input/Output Devices – Keyboard – Mouse – Mic- Monitor-Camera-Types of Printer, Scanner, Projector.Basic of Computer network-Modem, Hub, Switch, Bridge, Routers-Wi-Fi – Bluetooth. Introduction to Free and Open Source Software(FOSS) – Need of Open Sources – Advantages of Open Sources– Copy rights- Software piracy.
Unit- 2	Basics of Operating System –Difference between various operating systems-User Interface of windows 10 OS - create , Copy ,Move and delete files and folders -Use of pen drive -CD-DVD Burning -Windows tools and features-Disk Space management-Disk Clean up-Managing Recycle Bin-Disk defragmentation -Add/ remove software's and programs.
Unit- 3	Basic operating of word processing - Creating, opening and closing documents- Use of shortcuts-Creating and Editing of Text - Formatting the text - Find and replace - Drawing Table-Page layout-Header / Footer - Setting page number-Creating simple applications like - resume - letter writing ,job application ets- Printing document. Basics of Excel worksheet & its importance-creating simple worksheets- formulas-conditional formatting-sort-filter- chart. Introduction to PowerPoint-understand various views of presentation, animations, transitions, header, footer etc.
Unit -4	Internet – ISP- Word wide web (www)- web browser-search engine- creating & using an email account like gmail or any other- checking email and composing Email-Attaching documents- Usageof CC & BCC. Understanding IP address-Bandwidth -Storing and retrieving file through google drive –sharing files and folders-google docs - language translation -voice to text, text to voice application-Google Meet-Zoom-Social media merits and demerits. Online educational websites (Moocs-nptel - Swayam Central- spoken-tutorial.org)-Video tutorials-Step to use Government portals like aadhaar-Election commission website-Eservices(eservices.tn.gov.in) etc-– Job Portals - Online Bill payment- Online fund transfer using UPI gateway.
Unit- 5	Internet Safety concerns: (Digital Footprints, Threats, Virus, Worm, Trojan Horse, Spam, Malware,Adware, Spyware, Snooping)-Security Measures :(Antivirus, Firewall)- Cyber Crime: (Phishing,

	Pharming, Spoofing, Hacking, Cracking, Identity Theft)Cyber Safety (IT Act, Cyber Laws).

Reference Books :

Vikas B. Agarwal Jyoti P. Mirani, *Computer Fundamentals* -Publisher: Nirali Prakashan (1 August 2019)

Lambert Joan, Lambert Steve, *Windows 10 Step By Step*, Publisher : PHI Learning Pvt Ltd

Mike Mc Grath and Michael, *Office 2016 In Easy Steps*, Price Publisher: BPB Publications

Adesh K. Pandey, *Internet Fundamentals*

James KL, *The Internet : A Users Guide*

Jaago Teens, *Cyber Safety For Everyone* - BPB Publications (October 12, 2019)

Refer website's and You tube tutorials .

Outcomes	➢ Skills to work efficiently with windows, word, excel, powerpoint presentation. ➢ Skills to use internet for various purpose with safe and secure.

Course Designed by
V.ANANTHA KRISHNAN , M.Sc.M.Phil

இரண்டாம் ஆண்டு - நான்காம் பருவம்				
பாடக்குறியீட்டு எண்: 22NME4A	பள்ளியில் தமிழ் பயிலாத மாணாக்கர்களுக்கான அடிப்படைத் தமிழ்ப் பாடங்கள்	T/P	C	H/W
	இலக்கியமும் மொழிப் பயன்பாடும்	T	2	2

நோக்கம்	➢ மாணவர்கள் தமிழின் சிறப்புகள் அறிதல். ➢ பிழையின்றித் தமிழ் பேசுவதற்குப் பயிற்சி அளித்தல்
அலகு1	தமிழ் நீதி இலக்கியக் கருத்துக்களை அறிதல் திருக்குறள் (**அறன் வலியுறுத்தல்**) – 10 குறட்பாக்கள் ஆத்தி சூடி – முதல் 20 பாடல்கள் மூதுரை – முதல் 15 பாடல்கள்
அலகு2	தமிழின் சிறப்புகளை அறிதல் – (வாய்மொழித் தேர்வு) தமிழ்மொழியின் தொன்மை – சிறப்பு – தமிழ் இலக்கியங்கள் – சங்கப்புலவர்கள் தமிழ்க்காப்பியங்கள் – புதுக்கவிஞர்கள் – குறித்த செய்திகளை அறிதல்
அலகு3	சொற்களின் பயன்பாடு. அருஞ்சொற்பொருள் அறிதல் – பிரித்து எழுதுதல் – சேர்த்து எழுதுதல் – எதிர்ச்சொல் அறிதல், ஓரெழுத்து ஒரு மொழி அறிதல்
அலகு4	பிழையின்றித் தமிழ் பேசுவதற்குப் பயிற்சி அளித்தல் (வாய்மொழித் தேர்வு) 1. பழமொழிகள், உவமைகள், மரபுத்தொடர்கள் ஆகியவை குறித்து அறிந்து பேசும் திறன்களை வளர்த்தல். 2. வரவேற்புரை, நன்றியுரை ஆற்றுவதற்குப் பயிற்சி அளித்தல் 3. கதைசொல்லும் திறன்களை வளர்த்தல்.(நீதிக் கதைகள் கூறல்)
அலகு5	மொழிபெயர்ப்பு ஆங்கிலத்திலிருந்து தமிழில் மொழிபெயர்த்தல் 1. ஆங்கிலச் சொற்களை மொழி பெயர்த்தல் 2. ஆங்கிலத் தொடர்களைத் தமிழில் மொழிபெயர்த்தல்
பயன்கள்	➢ அச்சமின்றி தெளிவாக தங்களது கருத்துக்களை மாணவர்கள் எடுத்துரைக்க வழி அறிதல். ➢ சொற்களின் பயன்பாடு, தயக்கமின்றி பேசக் கற்றுக்கொள்வதால் மாணவர்கள் தன்னம்பிக்கை பெறுதல்

இரண்டாம் ஆண்டு - நான்காம் பருவம்				
பாடக்குறியீட்டு எண்: 22NME4B	பள்ளியில் மேல்நிலைப் படிப்பு வரை தமிழ் பயின்று கல்லூரியில் பகுதி 1-இல் தமிழ் பயிலாத மாணாக்கர்களுக்கான சிறப்புத் தமிழ்ப்பாடங்கள்	T/P	C	H/W
	பழந்தமிழ் இலக்கியங்களும் இலக்கியவரலாறும்	T	2	2

நோக்கம்	➢ மாணவர்கள் தமிழ் மொழியினைக் கற்பதால் அரிய இலக்கியங்களை அறியச் செய்தல் ➢ **வாழ்வியல் அறங்களுக்கு வழிகாட்டுதலாக இருத்தல்**
அலகு I	**சங்க இலக்கியம்** 1. நற்றிணை – 'நயனும், நண்பும், நாணூ 'எனத் தொடங்கும்பாடல் (குறிஞ்சி - 392) 2. குறுந்தொகை– 'நெய்தல் இருங் கழி' எனத் தொடங்கும் நெய்தற் பத்து பாடல். (நெய்தல்) 3. ஐங்குறுநூறு – 'வானம் பாடி வறம்' எனத் தொடங்கும் கிழவன் பருவம் பாராட்டுப் பத்து பாடல். (முல்லை) 4. அகநானூறு – 'கடல்கண் டன்ன' எனத் தொடங்கும் பாடல் (மருதம் - 176) 5. புறநானூறு – 'உண்டால் அம்ம இவ்வுலகம்' எனத் தொடங்கும் பாடல் 182. பிறர்க்கென முயலுநர்! பாடியவர்: கடலுள் மாய்ந்த இளம்பெரு வழுதி.
அலகு II	**காப்பிய இலக்கியம்** சிலப்பதிகாரம் – அடைக்கலக் காதை (மதுரைக் காண்டம்)
அலகு III	**நீதி இலக்கியம்** 1. திருக்குறள் – அறிவுடைமை – 10 குறட்பாக்கள் 2. நாலடியார் – மேன்மக்கள் (முதல் பாடல்) 3. நான்மணிக்கடிகை – 'அஞ்சாமை அஞ்சுக' எனத் தொடங்கும் பாடல் எண்: 27 4. இனியவை நாற்பது – 'எவது மாறாஇளக்கிளைமை' எனத் தொடங்கும் பாடல் எண்: 3 5. இன்னா நாற்பது – 'ஆற்றல் இலாதான் பிடித்த படை' எனத் தொடங்கும் பாடல் எண்: 07
அலகு IV	**இலக்கியவரலாறு** 1. சங்க காலம் – எட்டுத்தொகை, பத்துப்பாட்டு. 2. காப்பிய இலக்கிய வரலாறு – ஐம்பெருங் காப்பியங்கள் – ஐஞ்சிறு காப்பியங்கள் 3. சிற்றிலக்கியங்கள் தோற்றமும் வளர்ச்சியும் 4. புதுக்கவிதை தோற்றமும் வளர்ச்சியும்.

அலகு	**இலக்கணம்** 1. சொல்வகை – பெயர், வினை, இடை, உரி 2. அணி இலக்கணம் – உவமை அணி, உருவக அணி தற்குறிப்பேற்ற அணி, உயர்வு நவிற்சி அணி. 3. புதுக்கவிதை இலக்கணம்– படிமம் குறியீடு.
பயன்கள்	➢ அரசுப் பணி பெறுவதற்கான வாய்ப்பினை நல்குதல். ➢ நடைமுறைத் தமிழ் இலக்கியத்தை அறைய உதவுதல்

Semester-IV				
Course code: 22NME4C	**NME**	**T/P**	**C**	**H/W**
	Small Business Management	**T**	**2**	**2**

Objectives	➢ To understand the policy initiatives and infrastructural support for establishing a small scale enterprises ➢ To analyze the opportunities for starting a small enterprise.
Unit-I	Small Scale enterprises–An Introduction and overview–Definition–Scope and importance – relative advantages of small scale enterprises vis - a – vis –Large andmedium scale industries – Efforts to development of SSE- Meaning and concept ofentrepreneurship, the history of entrepreneurship development, role of entrepreneurship in economic development, agencies in entrepreneurship management and future of entrepreneurship.
Unit-II	Policy and institutional infrastructure for small enterprises – Development agencies for small enterprise–small enterprises growth and environmental factors influency–funding agencies and their role in Developing SSE.- Meaning of entrepreneur, the skills required to be an entrepreneur, the entrepreneurial decision process, and role models, mentors and support system.
Unit-III	Establishing the small scale enterprises–opportunities scanning–Choice of enterprise–Market assessment for SSE–Choice of technology and selection of site–Financing then ew/small enterprise– Preparation of business plan–Ownership structure and organizational framework-Business ideas, methods of generating ideas, and opportunity recognition
Unit-IV	Operating the small-scale enterprise – Financial management issues in SSE – Operation management issues in SSE – Marketing management issues in SSE-Importance of new venture financing, types of owner ship securities, venture capital, types of debt securities, Determining ideal debt-equity mix, and financial institutions and banks
Unit-V	Performance appraisal and growth strategies – Management performance assessment and control–Growth and stabilization strategies for small enterprises – Managing family enterprises–Related Cases-Exit strategies for entrepreneurs, bankruptcy, and Succession and harvesting strategy
Unit-VI	Dynamic Component for Continuous Internal Assessment only: Contemporary Developments Related to the Course during the Semester concerned.

REFERENCES:

MathurS.P.(1979)*Economicsofsmall-scaleindustries.*

Siropolis.(1986)*EntrepreneurshipandsmallBusinessManagement*

VasantDesai.(1979)*Organizationandmanagementofsmallscaleindustries*.

Outcomes	➢ Thestudentshouldbeablefindoutasuitableideaforstartingasmallenterprise ➢ The student should be able to visualize the importance of small scale enterprises in economic development.

B.Sc.,

COMPUTER SCIENCE

SYLLABUS

FROM THE ACADEMIC YEAR

2023 - 2024

TAMILNADU STATE COUNCIL FOR HIGHER EDUCATION, CHENNAI – 600 005

1. Introduction

B.Sc. Computer Science

Education is the key to development of any society. Role of higher education is crucial for securing right kind of employment and also to pursue further studies in best available world class institutes elsewhere within and outside India. Quality education in general and higher education in particular deserves high priority to enable the young and future generation of students to acquire skill, training and knowledge in order to enhance their thinking, creativity, comprehension and application abilities and prepare them to compete, succeed and excel globally. Learning Outcomes-based Curriculum Framework (LOCF) which makes it student-centric, interactive and outcome-oriented with well-defined aims, objectives and goals to achieve. LOCF also aims at ensuring uniform education standard and content delivery across the state which will help the students to ensure similar quality of education irrespective of the institute and location.

Computer Science is the study of quantity, structure, space and change, focusing on problem solving, application development with wider scope of application in science, engineering, technology, social sciences etc. throughout the world in last couple of decades and it has carved out a space for itself like any other disciplines of basic science and engineering. Computer science is a discipline that spans theory and practice and it requires thinking both in abstract terms and in concrete terms. Nowadays, practically everyone is a computer user, and many

people are even computer programmers. Computer Science can be seen on a higher level, as a science of problem solving and problem solving requires precision, creativity, and careful reasoning. The ever-evolving discipline of computer science also has strong connections to other disciplines. Many problems in science, engineering, health care, business, and other areas can be solved effectively with computers, but finding a solution requires both computer science expertise and knowledge of the particular application domain. Computer science has a wide range of specialties. These include Computer Architecture, Software Systems, Graphics, Artificial Intelligence, Computational Science, and Software Engineering. Drawing from a common core of computer science knowledge, each specialty area focuses on specific challenges. Computer Science is practiced by mathematicians, scientists and engineers. Mathematics, the origins of Computer Science, provides reason and logic. Science provides the methodology for learning and refinement. Engineering provides the techniques for building hardware and software.

Programme Outcome, Programme Specific Outcome and Course Outcome

Computer Science is the study of quantity, structure, space and change, focusing on problem solving, application development with wider scope of application in science, engineering, technology, social sciences etc. The key core areas of study in Mathematics include Algebra, Analysis (Real & Complex), Differential Equations, Geometry, and Mechanics. The

Students completing this programme will be able to present Software application clearly and precisely, make abstract ideas precise by formulating them in the Computer languages. Completion of this programme will also enable the learners to join teaching profession, enhance their employability for government jobs, jobs in software industry, banking, insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises.

2. Programme Outcomes (PO) of B.Sc. degree programme in Computer Science

- Scientific aptitude will be developed in Students
- Students will acquire basic Practical skills & Technical knowledge along with domain knowledge of different subjects in the Computer Science & humanities stream.
- Students will become employable; Students will be eligible for career opportunities in education field, Industry, or will be able to opt for entrepreneurship.
- Students will possess basic subject knowledge required for higher studies, professional and applied courses.

- Students will be aware of and able to develop solution oriented approach towards various Social and Environmental issues.
- Ability to acquire in-depth knowledge of several branches of Computer Science and aligned areas. This Programme helps learners in building a solid foundation for higher studies in Computer Science and applications.
- The skills and knowledge gained leads to proficiency in analytical reasoning, which can be utilized in modelling and solving real life problems.
- Utilize computer programming skills to solve theoretical and applied problems by critical understanding, analysis and synthesis.
- To recognize patterns and to identify essential and relevant aspects of problems.
- Ability to share ideas and insights while seeking and benefitting from knowledge and insight of others.
- Mould the students into responsible citizens in a rapidly changing interdependent society.

The above expectations generally can be pooled into 6 broad categories and can be modified according to institutional requirements:

PO1: Knowledge

PO2: Problem Analysis

PO3: Design / Development of Solutions

PO4: Conduct investigations of complex problems

PO5: Modern tool usage

PO6: Applying to society

3. Programme Specific Outcomes of B.Sc. Degree Programme in Computer Science

PSO1: Think in a critical and logical based manner

PSO2: Familiarize the students with suitable software tools of computer science and industrial applications to handle issues and solve problems in mathematics or statistics and realtime application related sciences.

PSO3: Know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand.

PSO4: Understand, formulate, develop programming model with logical approaches to a Address issues arising in social science, business and other contexts.

PSO5: Acquire good knowledge and understanding to solve specific theoretical and applied problems in advanced areas of Computer science and Industrial statistics.

PSO6: Provide students/learners sufficient knowledge and skills enabling them to undertake further studies in Computer Science or Applications or Information Technology and its allied areas on multiple disciplines linked with Computer Science.

PSO7: Equip with Computer science technical ability, problem solving skills, creative talent and power of communication necessary for various forms of employment.

PSO8: Develop a range of generic skills helpful in employment, internships& societal activities.

PSO9: Get adequate exposure to global and local concerns that provides platform for further exploration into multi-dimensional aspects of computing sciences.

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs) and Programme Specific Outcomes (PSOs) can be carried out accordingly, assigning the appropriate level in the grids: (put tick mark in each row)

PO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
PO1	✓					
PO2		✓				
PO3			✓			
PO4				✓		
PO5					✓	
PO6						✓

4. Highlights of the Revamped Curriculum

- Student-centric, meeting the demands of industry & society, incorporating industrial components, hands-on training, skill enhancement modules, industrial project, project with viva-voce, exposure to entrepreneurial skills, training for competitive examinations, sustaining the quality of the core components and incorporating application oriented content wherever required.
- The Core subjects include latest developments in the education and scientific front, advanced programming packages allied with the discipline topics, practical training, devising mathematical models and algorithms for providing solutions to industry / real life situations. The curriculum also facilitates peer learning with advanced mathematical topics in the final semester, catering to the needs of stakeholders with research aptitude.
- The General Studies and Computer Science based problem solving skills are included as mandatory components in the 'Training for Competitive Examinations' course at the final semester, a first of its kind.
- The curriculum is designed so as to strengthen the Industry-Academia interface and provide more job opportunities for the students.
- The Industrial Statistics course is newly introduced in the fourth semester, to expose the students to real life problems and train the students on designing a mathematical model to provide solutions to the industrial problems.
- The Internship during the second year vacation will help the students gain valuable work experience that connects classroom knowledge to real world experience and to narrow down and focus on the career path.

- Project with viva-voce component in the fifth semester enables the student, application of conceptual knowledge to practical situations. The state of art technologies in conducting a Explain in a scientific and systematic way and arriving at a precise solution is ensured. Such innovative provisions of the industrial training, project and internships will give students an edge over the counterparts in the job market.
- State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and inter disciplinary nature are incorporated as Elective courses, covering conventional topics to the latest – Statistics with R Programming, Data Science, Machine learing. Internet of Things and Artificial Intelligence etc..

5. Value additions in the Revamped Curriculum:

Semester	Newly introduced Components	Outcome / Benefits
I	**Foundation Course** To ease the transition of learning from higher secondary to higher education, providing an overview of the pedagogy of learning abstract Mathematics and simulating mathematical concepts to real world.	• Instil confidence among students • Create interest for the subject
I, II, III, IV	**Skill Enhancement papers** (Discipline centric / Generic / Entrepreneurial)	• Industry ready graduates • Skilled human resource • Students are equipped with essential skills to make them employable
		• Training on Computing / Computational skills enable the students gain knowledge and exposure on latest computational aspects
		• Data analytical skills will enable students gain internships, apprenticeships, field work involving data collection, compilation, analysis etc.
		• Entrepreneurial skill training will provide an opportunity for independent livelihood • Generates self – employment • Create small scale entrepreneurs • Training to girls leads to women empowerment
		• Discipline centric skill will improve the Technical knowhow of solving real life problems using ICT tools
III, IV, V & VI	Elective papers- An open choice of topics categorized under Generic and Discipline Centric	• Strengthening the domain knowledge • Introducing the stakeholders to the State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and inter disciplinary nature

		• Students are exposed to Latest topics on Computer Science / IT, that require strong mathematical background • Emerging topics in higher education / industry / communication network / health sector etc. are introduced with hands-on-training, facilitates designing of mathematical models in the respective sectors
IV	Industrial Statistics	• Exposure to industry moulds students into solution providers • Generates Industry ready graduates • Employment opportunities enhanced
II year Vacation activity	Internship / Industrial Training	• Practical training at the Industry/ Banking Sector / Private/ Public sector organizations / Educational institutions, enable the students gain professional experience and also become responsible citizens.
V Semester	Project with Viva – voce	• Self-learning is enhanced • Application of the concept to real situation is conceived resulting in tangible outcome
VI Semester	Introduction of Professional Competency component	• Curriculum design accommodates all category of learners; 'Mathematics for Advanced Explain' component will comprise of advanced topics in Mathematics and allied fields, for those in the peer group / aspiring researchers; • 'Training for Competitive Examinations' –caters to the needs of the aspirants towards most sought - after services of the nation viz, UPSC, CDS, NDA, Banking Services, CAT, TNPSC group services, etc.
Extra Credits: **For Advanced Learners / Honors degree**		• To cater to the needs of peer learners / research aspirants

Skills acquired from the Courses	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill

Credit Distribution for UG Programmes

Sem I	Credit	H	Sem II	Credit	H	Sem III	Credit	H	Sem IV	Credit	H	Sem V	Credit	H	Sem VI	Credit	H
Part 1. Language – Tamil	3	6	Part..1. Language – Tamil	3	6	Part..1. Language – Tamil	3	6	Part..1. Language – Tamil	3	6	5.1 Core Course – \CC IX	4	5	6.1 Core Course – CC XIII	4	6
Part.2 English	3	6	Part..2 English	3	6	Part..2 English	3	6	Part..2 English	3	6	5.2 Core Course – CC X	4	5	6.2 Core Course – CC XIV	4	6
1.3 Core Course – CC I	5	5	2..3 Core Course – CC III	5	5	3.3 Core Course – CC V	5	5	4.3 Core Course – CC VII Core Industry Module	5	5	5. 3.Core Course CC -XI	4	5	6.3 Core Course – CC XV	4	6
1.4 Core Course – CC II	5	5	2.4 Core Course – CC IV	5	5	3.4 Core Course – CC VI	5	5	4.4 Core Course – CC VIII	5	5	5. 4.Core Course –/ Project with viva-voce CC -XII	4	5	6.4 Elective -VII Generic/ Discipline Specific	3	5
1.5 Elective I Generic/ Discipline Specific	3	4	2.5 Elective II Generic/ Discipline Specific	3	4	3.5 Elective III Generic/ Discipline Specific	3	4	4.5 Elective IV Generic/ Discipline Specific	3	3	5.5 Elective V Generic/ Discipline Specific	3	4	6.5 Elective VIII Generic/ Discipline Specific	3	5
1.6 Skill Enhancement Course SEC-1	2	2	2.6 Skill Enhancement Course SEC-2	2	2	3.6 Skill Enhancement Course SEC-4, (Entrepreneurial Skill)	1	1	4.6 Skill Enhancement Course SEC-6	2	2	5.6 Elective VI Generic/ Discipline Specific	3	4	6.6 Extension Activity	1	-
1.7 Skill Enhancement -(Foundation Course)	2	2	2.7 Skill Enhancement Course –SEC-3	2	2	3.7 Skill Enhancement Course SEC-5	2	2	4.7 Skill Enhancement Course SEC-7	2	2	5.7 Value Education	2	2	6.7 Professional Competency Skill	2	2
						3.8 E.V.S.	-	1	4.8 E.V.S	2	1	5.8 Summer Internship /Industrial Training	2				
	23	**30**		**23**	**30**		**22**	**30**		**25**	**30**		**26**	**30**		**21**	**30**
Total – 140 Credits																	

Choice Based Credit System (CBCS), Learning Outcomes Based Curriculum Framework (LOCF) Guideline Based Credit and Hours Distribution System for all UG courses including Lab Hours

First Year – Semester-I

Part	List of Courses	Credit	No. of Hours
Part-1	Language – Tamil	3	6
Part-2	English	3	6
Part-3	Core Courses & Elective Courses [in Total]	13	14
Part-4	Skill Enhancement Course SEC-1	2	2
	Foundation Course	2	2
		23	**30**

Semester-II

Part	List of Courses	Credit	No. of Hours
Part-1	Language – Tamil	3	6
Part-2	English	3	6
Part-3	Core Courses & Elective Courses including laboratory [in Total]	13	14
Part-4	Skill Enhancement Course -SEC-2	2	2
	Skill Enhancement Course -SEC-3 (Discipline / Subject Specific)	2	2
		23	**30**

Second Year – Semester-III

Part	List of Courses	Credit	No. of Hours
Part-1	Language - Tamil	3	6
Part-2	English	3	6
Part-3	Core Courses & Elective Courses including laboratory [in Total]	13	14
Part-4	Skill Enhancement Course -SEC-4 (Entrepreneurial Based)	1	1
	Skill Enhancement Course -SEC-5 (Discipline / Subject Specific)	2	2
	E.V.S	-	1
		22	**30**

Semester-IV

Part	List of Courses	Credit	No. of Hours
Part-1	Language - Tamil	3	6
Part-2	English	3	6
Part-3	Core Courses & Elective Courses including laboratory [in Total]	13	13
Part-4	Skill Enhancement Course -SEC-6 (Discipline / Subject Specific)	2	2
	Skill Enhancement Course -SEC-7 (Discipline / Subject Specific)	2	2
	E.V.S	2	1

		25	**30**

Third Year
Semester-V

Part	List of Courses	Credit	No. of Hours
Part-3	Core Courses including Project / Elective Based	22	26
Part-4	Value Education	2	2
	Internship / Industrial Visit / Field Visit	2	2
		26	**30**

Semester-VI

Part	List of Courses	Credit	No. of Hours
Part-3	Core Courses including Project / Elective Based & LAB	18	28
Part-4	Extension Activity	1	-
	Professional Competency Skill	2	2
		21	**30**

Consolidated Semester wise and Component wise Credit distribution

Parts	Sem I	Sem II	Sem III	Sem IV	Sem V	Sem VI	Total Credits
Part I	3	3	3	3	-	-	12
Part II	3	3	3	3	-	-	12
Part III	13	13	13	13	22	18	92
Part IV	4	4	3	6	4	1	22
Part V	-	-	-	-	-	2	2
Total	23	23	22	25	26	21	**140**

***Part I. II, and Part III components will be separately taken into account for CGPA calculation and classification for the under graduate programme and the other components. IV, V have to be completed during the duration of the programme as per the norms, to be eligible for obtaining the UG degree.**

B.Sc., Computer Science
First Year-Semester-I

Sem.	Part	Course Code	Courses	List of Courses	T/P	Credit	Hours per week (L/T/P)	Max. Marks		
								Int.	Ext.	Total
	Part-I	2311T	T/OL	தமிழ் இலக்கிய வரலாறு /other Language-I	T	3	6	25	75	100
	Part-II	2312E	E	General English-I	T	3	6	25	75	100
	Part-III	23BCE1C1	CC 1	Programming In C	T	5	5	25	75	100
		23BCE1P1	CC 2	Practical : Programming In C Lab	P	3	4	25	75	100
		-	Generic Elective (Allied)	BCA/ B.Sc., IT/Maths/Electronics/software	T	3	3	25	75	100
		-		Respective Allied Theory -Practical	P	2	2	25	75	100
	Part-IV	23BCES1	SEC-I	Fundamentals of Information Technology	T	2	2	25	75	100
		23BCEFC	FC	Problem Solving Techniques	T	2	2	25	75	100
				TOTAL	**-**	**23**	**30**	**200**	**600**	**800**

- TOL-Tamil/Other Languages,
- E – English
- CC - Core course –Core competency, critical thinking, analytical reasoning, research skill &teamwork
- Generic Elective(Allied)
- SEC-Skill Enhancement Course - Exposure beyond the discipline (Value Education ,Entrepreneurship Course, Computer application for Science, etc.,
- FC-Foundation Course
- T/P- T-Theory, P-Practical

Chairperson details: Mrs.R.Indra, Government Arts College for Women, Sivagangai.Mobile No: 9442722566

CORE COURSE 1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCE1C1	**PROGRAMMING IN C**	Core	5	-	-	-	5	5	25	75	100
Learning Objective											
LO1	To familiarize the students with the Programming basics and the fundamentals of C, Datatypes in C, Mathematical and logical operations.										
LO2	To understand the concept using if statements and loops										
LO3	This unit covers the concept of Arrays										
LO4	This unit covers the concept of Functions, Structurs and unions										
LO5	To understand the concept of implementing pointers and Files.										
	Contents										
UNIT I	Overview of C: History of C – Importance of C – Basic Structure of C Programs – Programming Style – Character Set – C Tokens – Keywords and Identifiers – Constants, Variables and Data Types – Declaration of Variables – Defining Symbolic Constants – Declaring a variable as a constant – overflow and underflow of data – Operators and Expressions: Arithmetic, relational, logical, assignment operators – increment and decrement operators, conditional operators, bitwise operators, special operators – Arithmetic Expressions- Evaluation of Expressions – Precedence of Arithmetic Operators – Type Conversions in Expressions – Operator Precedence and Associativity Mathematical functions.										
UNIT II	Managing I/O Operations: Reading and Writing a Character – Formatted Input, Output – Decision Making & Branching: if statement - if else statement - nesting of if else statements - else if ladder – switch statement – the ?: operator – goto statement – the while statement – do statement – the for statement – jumps in loops.										
UNIT III	Arrays: One-Dimensional Arrays – Declaration, Initialization – Two-Dimensional Arrays – Multi-dimensional Arrays – Dynamic Arrays – Initialization. Strings: Declaration, Initialization of string variables – reading and writing strings – string handling functions										
UNIT IV	User-defined functions: need – multi-function programs – elements of user defined functions – definition – return values and their types – function calls, declaration, category – all types of arguments and return values – nesting of functions – recursion – passing arrays, strings to functions – scope visibility and life time of variables. Structures and Unions: Defining a structure – declaring a structure variable – accessing structure members – initialization – copying and comparing – operation on individual members – array of structures – arrays within structures – structures within structures –										

	structures and functions –unions – size of structures – bit fields.	
UNIT V	**Pointers:** the address of a variable – declaring, initialization of pointer variables – accessing a variable through its pointer – chain of pointers – pointer increments and scale factors – pointers and character strings – pointers as function arguments – pointers and structures. **Files**: Defining, opening, closing a file – IO Operations on files – Error handling during IO operations – command line arguments.	
Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
CO1	Remember the program structure of C with its syntax and semantics	PO1,PO3,PO5
CO2	Understand the programming principles in C (data types, operators, branching and looping, arrays, functions, structures, pointers and files)	PO2,PO3,PO6
CO3	Apply the programming principles learnt in real-time problems	PO3,PO4,PO5
CO4	Analyze the various methods of solving a problem and choose the best method	PO4,PO5,PO6
CO5	Code, debug and test the programs with appropriate test cases	PO5,PO6
Text Book		
1	E.Balagurusamy , 2012, *Programming in ANSI C*, , 6th Edition, Tata McGraw Hill Publishing Company. UNIT I: Chapters 1 (Except 1.3-1.7, 1.10-1.12), 2 (Except 2.9, 2.13), 3 (Except 3.13) UNIT II: Chapters 4 – 6 UNIT III: Chapters 7, 8 (Except 8.5, 8.6, 8.7, 8.9, 8.10) UNIT IV: Chapters 9 (Except 9.20), 10 UNIT V: Chapters 11 (Except 11.8, 11.10, 11.12, 11.14, 11.15, 11.17), 12 (Except 12.6)	
Reference Books		
1.	Byron Gottfried, Schaum's Outline Programming with C, Fourth Edition, Tata McGraw-Hill, 2018.	
2.	Kernighan and Ritchie, The C Programming Language, Second Edition, Prentice Hall, 1998	
3.	YashavantKanetkar, Let Us C, Eighteenth Edition, BPB Publications,2021	
Web Resources		

1.	https://codeforwin.org/
2.	https://www.geeksforgeeks.org/c-programming-language/
3.	http://en.cppreference.com/w/c
4.	http://learn-c.org/
5.	https://www.cprogramming.com/

CORE PRACTICAL

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCE1P1	**PROGRAMMING IN C LAB**	Core	-	-	3	-	3	4	25	75	100

Course Objective	
LO1	To familiarize the students with the Programming basics and the fundamentals of C, Datatypes in C, Mathematical and logical operations.
LO2	To understand the concept using if statements and loops
LO3	This unit covers the concept of Arrays and Functions
LO4	This unit covers the concept of Structurs and unions and Preprocessors
LO5	To understand the concept of implementing pointers and files
Group A	**List of Excercises** 1. Write a C Program to find the sum of digits. 2. Write a C Program to check whether a given number is Armstrong or not. 3. Write a C Program to check whether a given number is Prime or not. 4. Write a C Program to generate the Fibonacci series. 5. Write a C Program to display the given number is Adam number or not. 6. Write a C Program to print reverse of the given number and string. 7. Write a C Program to find minimum and maximum of 'n' numbers using array. 8. Write a C Program to arrange the given number in ascending order. 9. Write a C Program to add and multiply two matrices. 10. Write a C Program to calculate NCR and NPR.
Group B	1. Write a C Program to find the grade of a student using else if ladder. 2. Write a C Program to implement the various string handling function. 3. Write a C Program to create an integer file and displaying the even numbers only. 4. Write a C Program to calculate quadratic equation using switch-case. 5. Write a C Program to count number of characters, words and lines in a text file. 6. Write a C Program to generate student mark list using array of structures. 7. Write a C Program to create and process the student mark list using file 8. Write a C Program to create and process pay bill using file 9. Write a C Program to create and process inventory control using file 10. Write a C Program to create and process electricity bill using file

Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	

1	Remember the program structure of C with its syntax and semantics	PO1,PO3,PO5
2	Understand the programming principles in C (data types, operators, branching and looping, arrays, functions, structures, pointers and files)	PO2,PO3,PO6
3	Apply the programming principles learnt in real-time problems	PO3,PO4
4	Analyze the various methods of solving a problem and choose the best method	PO4,PO5,PO6
5	Code, debug and test the programs with appropriate test cases	PO4,PO6
Text Book		
1	E. Balagurusamy, Programming in ANSI C, Fifth Edition, Tata McGraw-Hill, 2010.	
Reference Books		
1.	Byron Gottfried, Schaum's Outline Programming with C, Fourth Edition, Tata McGraw-Hill, 2018.	
2.	Kernighan and Ritchie, The C Programming Language, Second Edition, Prentice Hall, 1998	
3.	YashavantKanetkar, Let Us C, Eighteenth Edition, BPB Publications,2021	
Web Resources		
1.	https://codeforwin.org/	
2.	https://www.geeksforgeeks.org/c-programming-language/	
3.	http://en.cppreference.com/w/c	
4.	http://learn-c.org/	
5.	https://www.cprogramming.com/	

SKILL ENHANCEMENT COURSE

Subject Code	Subject Name	Category	L	T	P	S	Inst. hours	Credits	Marks		
									CIA	External	Total
23BCES1	**Fundamentals of Information Technology**	Skill Enha. Course (SEC)	2	-	-	-	2	2	25	75	100

Learning Objectives		
LO1		Understand basic concepts and terminology of information technology.
LO2		Have a basic understanding of personal computers and their operation
LO3		Be able to identify data storage and its usage
LO4		Get great knowledge of software and its functionalities
LO5		Understand about operating system and their uses
		Contents
Unit I		**Introduction to Computers:** Introduction, Definition, .Characteristics of computer, Evolution of Computer, Block Diagram Of a computer, Generations of Computer, Classification Of Computers, Applications of Computer, Capabilities and limitations of computer
Unit II		**Basic Computer Organization:** Role of I/O devices in a computer system. Input Units: Keyboard, Terminals and its types. Pointing Devices, Scanners and its types, Voice Recognition Systems, Vision Input System, Touch Screen, Output Units: Monitors and its types. Printers: Impact Printers and its types. Non Impact Printers and its types, Plotters, types of plotters, Sound cards, Speakers.
Unit III		**Storage Fundamentals:** Primary Vs Secondary Storage, Data storage & retrieval methods. Primary Storage: RAM ROM, PROM, EPROM, EEPROM. Secondary Storage: Magnetic Tapes, Magnetic Disks. Cartridge tape, hard disks, Floppy disks Optical Disks, Compact Disks, Zip Drive, Flash Drives
Unit IV		**Software:** Software and its needs, Types of S/W. System Software: Operating System, Utility Programs Programming Language: Machine Language, Assembly Language, High Level Language their advantages & disadvantages. Application S/W and its types: Word Processing, Spread Sheets Presentation, Graphics, DBMS s/w
Unit V		**Operating System:** Functions, Measuring System Performance, Assemblers, Compilers and Interpreters.Batch Processing, Multiprogramming, Multi Tasking, Multiprocessing, Time Sharing, DOS, Windows, Unix/Linux.

	Course Outcomes	Programme Outcomes
CO	On completion of this course, students will	

CO1	Learn the basics of computer, Construct the structure of the required things in computer, learn how to use it.	PO1, PO2, PO3, PO4, PO5, PO6
CO2	Develop organizational structure using for the devices present currently under input or output unit.	PO1, PO2, PO3, PO4, PO5, PO6
CO3	Concept of storing data in computer using two header namely RAM and ROM with different types of ROM with advancement in storage basis.	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Work with different software, Write program in the software and applications of software.	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Usage of Operating system in information technology which really acts as a interpreter between software and hardware.	PO1, PO2, PO3, PO4, PO5, PO6

Textbooks

1		Anoop Mathew, S. KavithaMurugeshan (2009), " Fundamental of Information Technology", Majestic Books.
2		Alexis Leon, Mathews Leon," Fundamental of Information Technology", 2nd Edition.
3		S. K Bansal, "Fundamental of Information Technology".

Reference Books

1.		BhardwajSushilPuneet Kumar, "Fundamental of Information Technology"
2.		GG WILKINSON, "Fundamentals of Information Technology", Wiley-Blackwell
3.		A Ravichandran , "Fundamentals of Information Technology", Khanna Book Publishing

Web Resources

1.		https://testbook.com/learn/computer-fundamentals
2.		https://www.tutorialsmate.com/2020/04/computer-fundamentals-tutorial.html
3.		https://www.javatpoint.com/computer-fundamentals-tutorial
4.		https://www.tutorialspoint.com/computer_fundamentals/index.htm
5.		https://www.nios.ac.in/media/documents/sec229new/Lesson1.pdf

FOUNDATION COURSE

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCEFC	**Problem Solving Techniques**	FC	2	-	-	-	2	2	25	75	100

	Learning Objectives
LO1	Familiarize with writing of algorithms, fundamentals of C and philosophy of problem solving.
LO2	Implement different programming constructs and decomposition of problems into functions.
LO3	Use data flow diagram, Pseudo code to implement solutions.
LO4	Define and use of arrays with simple applications
LO5	Understand about operating system and their uses
	Contents
UNIT I	**Introduction:** History, characteristics and limitations of Computer. Hardware/Anatomy of Computer: CPU, Memory, Secondary storage devices, Input Devices and Output devices. Types of Computers: PC, Workstation, Minicomputer, Main frame and Supercomputer. Software: System software and Application software. **Programming Languages:** Machine language, Assembly language, High-level language,4 GL and 5GL-Features of good programming language. Translators: Interpreters and Compilers.
UNIT II	**Data:** Data types, Input, Processing of data, Arithmetic Operators, Hierarchy of operations and Output. Different phases in Program Development Cycle (PDC).**Structured Programming: Algorithm:** Features of good algorithm, Benefits and drawbacks of algorithm. **Flowcharts:** Advantages and limitations of flowcharts, when to use flowcharts, flowchart symbols and types of flowcharts.**Pseudocode:** Writing a pseudocode. Coding, documenting and testing a program: Comment lines and types of errors. **Program design:** Modular Programming.
UNIT III	**Selection Structures:** Relational and Logical Operators -Selecting from Several Alternatives – Applications of Selection Structures. **Repetition Structures:** Counter Controlled Loops –Nested Loops– Applications of Repetition Structures.
UNIT IV	**Data:** Numeric Data and Character Based Data. **Arrays:** One Dimensional Array - Two Dimensional Arrays – Strings as Arrays of Characters.

UNIT V	**Data Flow Diagrams:** Definition, DFD symbols and types of DFDs. **Program Modules:** Subprograms-Value and Reference parameters- Scope of a variable - Functions – Recursion. **Files:** File Basics-Creating and reading a sequential file- Modifying Sequential Files.

Course Outcomes		**Programme Outcomes**
CO	On completion of this course, students will	
CO1	Study the basic knowledge of Computers. Analyze the programming languages.	PO1, PO2, PO3, PO4, PO5, PO6
CO2	Study the data types and arithmetic operations. Know about the algorithms. Develop program using flow chart and pseudocode.	PO1, PO2, PO3, PO4, PO5, PO6
CO3	Determine the various operators. Explain about the structures. Illustrate the concept of Loops	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Study about Numeric data and character-based data. Analyze about Arrays.	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Explain about DFD Illustrate program modules. Creating and reading Files	PO1, PO2, PO3, PO4, PO5, PO6

Textbooks

1	**Stewart Venit,** "Introduction to Programming: Concepts and Design", Fourth Edition, 2010, Dream Tech Publishers.

Web Resources

1.	https://www.codesansar.com/computer-basics/problem-solving-using-computer.htm
2.	http://www.nptel.iitm.ac.in/video.php?subjectId=106102067
3.	http://utubersity.com/?page_id=876

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
23BCAA1	DIGITAL LOGIC FUNDAMENTALS	Elective Course 1	3	-	-	-	3	25	75	100

Course Objective	
CO1	To introduce the fundamentals of number systems and Digital logic.
CO2	To understand Boolean algebra, conversions and Binary arithmetic operations.
CO3	To get exposure to combinational logic circuits.
CO4	To understand the concept of sequential logic and flipflops
CO5	To study the design of counters and understand the memory types.

	Contents	No. of Hours
UNIT I	**NUMBER SYSTEMS AND DIGITAL LOGIC** Number Systems and Codes: Number System – Base Conversion – Binary Codes – Code Conversion. Digital Logic: Logic Gates – Truth Tables – Universal Gates.	**15**
UNIT II	**BOOLEAN ALGEBRA** Boolean Algebra: Laws and Theorems – SOP, POS Methods – Simplification of Boolean Functions – Using Theorems, K-Map, Prime – Implicant Method – Binary Arithmetic: Binary Addition – Subtraction – Various Representations of Binary Numbers – Arithmetic Building Blocks – Adder – Subtractor.	**15**
UNIT III	**COMBINATIONAL LOGIC** Combinational Logic: Multiplexers – Demultiplexers – Decoders – Encoders – Code Converters – Parity Generators and Checkers.	**15**
UNIT IV	**SEQUENTIAL LOGIC** Sequential Logic: RS, JK, D, and T Flip-Flops – Master-Slave Flip-Flops. Registers: Shift Registers – Types of Shift Registers.	**15**
UNIT V	**COUNTERS AND MEMORY** Counters: Asynchronous and Synchronous Counters - Ripple, Mod, Up-Down Counters– Ring Counters. Memory: Basic Terms and Ideas –Types of ROMs – Types of RAMs.	**15**
	Total Hours	**75**

	Course Outcome	Programme Outcome
CO	On completion of this course, students will	
1	Identify the logic gates and their functionality.	PO1, PO3,PO5
2	Perform number conversions from one system to another system.	PO2, PO3, PO6, PO7
3	Understand the functions of combinational circuits.	PO3, PO4, PO7
4	Perform number conversions.	PO4, PO5, PO6
5	Perform Counter design and learn its operations.	PO7, PO8

Text Book	
1	D.P.Leach and A.P.Malvino, Digital Principles and Applications – TMH – Fifth Edition – 2002.

Reference Books	
1.	V.Rajaraman and T.Radhakrishnan, Digital Computer Design, Prentice Hall of India, 2001
2.	M. Moris Mano, Digital Logic and Computer Design, PHI, 2001.
	T.C.Bartee, Digital Computer Fundamentals, 6th Edition, Tata McGraw Hill, 1991.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S	S	S	S	S	M	S	M
CO2	S	S	S	M	S	S	M	S
CO3	S	S	S	S	M	S	S	S
CO4	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong, M – Medium, L – Low

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
23BCAAP1	Digital Principles & Computer Organization -LAB	Allied Lab	-	-	2	-	2	25	75	100

Course Objectives:

1. To Understand the Digital Electronics Practically
2. To know how to solve gates and other functions.
3. To create Boolean laws.
4. Be able to work with flip-flops.
5. Be able to build multiplexer and de-multiplexer.

LAB EXERCISES	Required Hours
AND,ORandNOTGateusingTruthTable UniversalityofNAND&NORgates. Verification ofBooleanlawsusingNANDgates(AssociativeCommutative&DistributiveLaws) VerifyDe-Morganstheorem VerificationofBooleanlawsusingNORgates(Associative,Commutative&DistributiveLaws) SumofProductsusingNANDgatesandProductofSums usingNORGates. 4-bitbinaryparalleladderandSubtractorIC7483 CounterusingIC7473 StudyofRS,D,TandJKFlip-FlopswithIC's. StudyofEncoder&Decoder. StudyofMultiplexer&De-Multiplexer. Half and Full AdderusingSimple&NANDGates. HalfandFullSubtractorusingSimple&NANDGates.	**60**

Course Outcomes

On completion of this course, students will

CO1	Demonstrate the understanding of digital electronics
CO2	Identify the problem and solve using gates and other functions.
CO3	Identify suitable programming Boolean laws.
CO4	Learners can be work with flip-flops.
CO5	Develop multiplexer and de-multiplexer.

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO3	PSO 4	PSO 5	PSO 6
CO1	**2**	**2**	**2**	**2**	**3**	**2**
CO2	**2**	**1**	**3**	**2**	**-**	**2**
CO3	**3**	**3**	**1**	**1**	**1**	**2**
CO4	**2**	**3**	**3**	**1**	**-**	**1**
CO5	**3**	**2**	**3**	**1**	**1**	**-**
Weightage of course contributed to each PSO	12	11	12	7	5	7

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCAA2	**Resource Management Techniques**	**Allied**	3	-	-	-	3	3	25	75	100

Course Objective

CO 1	Describe the fundamental concepts of operations research and linear programming concepts.	
CO 2	Understand the mathematical formulation and optimality test.	
CO 3	Describe the concept of transhipment problem and assignment problem.	
CO 4	Classify the sequencing problems.	
CO 5	Demonstrate the use of network scheduling by PERT/CPM.	
	Details	**No. of Hours**
UNIT I	**Basics of Operations Research:** Introduction – Scope of Operations Research – Phases of Operations Research **-Linear Programming:** Introduction – Formulation of LP Problems – **Graphical Method:** Procedure for Solving LPP by Graphical Method.	6
UNIT II	**Transportation Problem:** Introduction – Mathematical Formulation – Definitions – Optimal Solution – North-West Corner Rule – Least Cost or Matrix Minima Method – Vogel's Approximation Method – Optimality Test – MODI Method.	6
UNIT III	**Transhipment and Assignment Problems:** Introduction – Transhipment Problem – Assignment Problem – Hungarian Method Procedure – Unbalanced Assignment Problem- Maximization in Assignment Problem.	6
UNIT IV	**Sequencing Problems:** Introduction – Definition – Terminology and Notations – Principal Assumptions – Type I: Problems with n Jobs through Two Machines – Type II: Processing n Jobs through Three Machines A, B, C – Type III: Problems with n Jobs and k Machines – Type IV: Problems with 2 Jobs through k Machines.	6
UNIT V	**Network Scheduling by PERT/CPM:** Introduction - Basic Terms - Common Errors - Rules of Network Construction - Numbering the Events (Fulkerson's Rule) - Time Analysis – Critical Path Method (CPM).	6
	Total	**30**

	Course Outcomes	**Programme Outcome**
CO	Upon completion of the course the students would be Able to:	
CO 1	Remember the fundamental concepts of operations research and linear programming concepts.	PO1, PO6
CO 2	Understand the mathematical formulation and optimality test.	PO2
CO 3	Apply the concept of transhipment problem and assignment problem	PO4, PO7
CO 4	Analyze the sequencing problems.	PO6
CO 5	Understand the use of network scheduling by PERT/CPM.	PO7, PO8
Text Book		
1	S.D. Sharma, Operations Research (Theory, Method & Applications) - Kedar Nath Ram Nath & Co – 1997.	
Reference Books		
1.	Hamdy A. Taha, Operations Research- An Introduction, Pearson Education, 10th Edition, 2019.	
2	Frederick S. Hillier, Gerald J. Lieberman et al., Introduction to operations Research, 11th Edition, TATA McGraw Hill, 2021	

Web Resources	
1.	https://www.mooc-list.com/tags/operations-research

S-Strong-3 M-Medium-2L-Low-1

CO/PSO	PSO1	PSO2	PSO 3	PS O4	PSO 5	PSO6
CO1	**3**	**2**	**1**	**-**	**-**	**1**
CO2	**2**	**2**	**2**	**1**	**-**	**-**
CO3	**3**	**1**	**1**	**-**	**1**	**-**
CO4	**1**	**2**	**1**	**2**	**2**	**1**
CO5	**3**	**2**	**1**	**2**	**3**	**2**
Weightage of course contributed to each PSO	12	9	6	5	6	4

Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCAAP2	**Resource Management Techniques Lab (Using C/C++/Python)**	**Allied Lab**	-	-	2	-	2	2	25	75	100

Course Objective	
CO1	Describe the linear programming model.
CO2	Understand the basic function of drawing the feasible region.
CO3	Describe the concept of north west corner rule.
CO4	Classify the Vogel's approximation rule and assignment problem.
CO5	Demonstrate the job sequencing problem and network scheduling by PERT/CPM.

S. No	**List of Lab Programs**	**No. of Hours**
1	Write a program to formulate the Linear Programming Model	**30**
2	Write a Program to represent the feasible region graphically	
3	Write a program to Implement the North-West Corner Rule	
4	Write a program to implement the Vogel's Approximation method	
5	Write a program to implement the assignment problem	
6	Write a program to implement the Hungarian Method	
7	Write a program to implement Job sequencing Problem	
8	Write a program to implement the Network Scheduling by PERT/CPM	

Course Outcomes		**Programme Outcome**
CO	Upon completion of the course the students would be able to:	
CO1	Remember the linear programming model.	PO1, PO6
CO 2	Understand the programming basic function of drawing the feasible region	PO2
CO 3	Apply the programming concept of north west corner rule	PO4, PO7
CO 4	Analyze the Vogel's approximation rule and assignment problem.	PO6
CO 5	Know the job sequencing problem and network scheduling by PERT/CPM.	PO7, PO8

Text Book	
1	S.D. Sharma, Operations Research (Theory, Method & Applications) - Kedar Nath Ram Nath & Co – 1997.

Reference Books	
1.	Hamdy A. Taha, Operations Research- An Introduction, Pearson Education, 10th Edition, 2019.
2.	Frederick S. Hillier, Gerald J. Lieberman et al., Introduction to operations Research, 11th Edition, TATA McGraw Hill, 2021

Web Resources	
1.	https://www.mooc-list.com/tags/operations-research

Mapping with Programme Outcomes:

S-

CO/PSO	PSO1	PSO2	PSO 3	PS O4	PSO 5	PSO6
CO1	**3**	**2**	**1**	**-**	**-**	**1**
CO2	**2**	**2**	**2**	**1**	**-**	**-**
CO3	**3**	**1**	**1**	**-**	**1**	**-**
CO4	**1**	**2**	**1**	**2**	**2**	**1**
CO5	**3**	**2**	**1**	**2**	**3**	**2**
Weightage of course contributed to each PSO	12	9	6	5	6	4

Strong-3 M-Medium-2L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCAAA3	Discrete Mathematics	Allied	3	-	-	-	3	3	25	75	100

Course Objective	
CO 1	Describe the fundamental concepts of set theory, functions and relations.
CO 2	Understand the mathematical formulation, Conditional Statements, Atomic and Compound Statements.
CO 3	Describe the concept and Principles of Normal Forms, Theory of Inference.
CO 4	Classify the insights of graph theory.
CO 5	Demonstrate the trees and Boolean algebra.

UNIT	Details	No. of Hours
UNIT I	**Fundamental Structures:-** Set Theory, Sets, Venn Diagrams, Complements, Cartesian Products, Power Sets, Finite and Infinite Sets. **Functions:-** Surjections, Injections, Inverses, Composition. **Relations:-** Reflexivity, Symmetry, Transitivity, Equivalence Relations.	6
UNIT II	**Logic:-** TF Statements, Connective, Disjunction, Negation, Conditional Statements, Bi Conditional Statements, Atomic and Compound Statements, Well formed Formulae, The Truth Table, Tautology, Tautological Implication Formulae with Distinct Truth Tables.	6
UNIT III	**Normal Forms:-** Principles of Normal Forms, Theory of Inference, Open Statements, Quantifiers, Valid Formulae and Equivalence, Theory of Inference for Predicate Calculus.	6
UNIT IV	**Graph Theory:-** Definition, Degrees, Sub Graph, Isomorphism, Complete Graph, Bipartite Graph – Representation of a Graph – Adjacency Matrix.	6
UNIT V	**Trees:** Spanning Tree – Kruskal's Algorithm, Prim's Algorithm, Dijkstra's Algorithm, **Boolean Algebra:-** Boolean Algebra, Boolean Functions.	6
	Total	**30**

Illustration for B.C.A. Allied Paper II Year – Semester – III & IV

	Course Outcomes	Programme Outcome
CO	Upon completion of the course the students would be Able to:	
CO 1	Remember the fundamental concepts of set theory, functions and relations.	PO1, PO6
CO 2	Understand the mathematical formulation Conditional Statements, Atomic and Compound Statements..	PO2
CO 3	Describe the concept and Principles of Normal Forms, Theory of Inference.	PO4, PO7
CO 4	Analyze and Classify the insights of graph theory.	PO6
CO 5	Understand the use trees and Boolean algebra.	PO7, PO8

Text Book	
1	Jean-Paul Trembly & Manohar, R. (2017). *Discrete Mathematics Structures with Applications to Computer Science.* Tata Mc Graw-Hill.

Reference Books	
1.	Venkataraman, M.K., Sridharan, N., & Chandrasekaran, N. (2009). *Discrete Mathematics*. National Publishing co.
Web Resources	
1.	https://mathworld.wolfram.com/DiscreteMathematics.html

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO 3	PS O4	PSO 5	PSO6
CO1	3	2	1	-	-	1
CO2	2	2	2	1	-	-
CO3	3	1	1	-	1	-
CO4	1	2	1	2	2	1
CO5	3	2	1	2	3	2
Weightage of course contributed to each PSO	12	9	6	5	6	4

S-Strong-3 M-Medium-2L-Low-1

Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCAAP3	**Excel & C++ Lab for Discrete Mathematics**	**Allied Lab**	-	-	2	-	2	2	25	75	100

Course Objective	
CO1	To impart the knowledge about solving Logical problems
CO2	Understand and create truth table using spreadsheets.
CO3	Understand and create spreadsheets for demorgan's theorem.
CO4	Classify the various set operations.
CO5	Demonstrate and implement prim's algorithms.

S. No	**List of Lab Programs**	**No. of Hours**
1	Create a truth table using spreadsheet for AND, OR and NOT functions.	**30**
2	Create a truth table using spreadsheet for XOR of two variables, using your spreadsheet's AND, OR, and NOT functions to calculate the truth value.	
3	Create a truth table, using your spreadsheet's logical functions, for the expression: **(**(P ∧7Q**)** ∨ **(**7P ∧Q).	
4	Create a truth table using your spreadsheet for demorgan's theorem.	
5	Create a truth table using spreadsheet to check whether the given expression is tautology or not (P ∧Q) ∨ **(**7P ∧Q) ∨ **(**P∧7Q) ∨ **(**7P ∧7Q)	
6	Write a C++ Program to implement various set operations (union, intersection, difference, symmetric difference).	
7	Write a C++ Program to find power set of a set with size n.	
8	Write a C++ program to perform following operation: a) is the given relation is reflexive? b) is the given relation is symmetric? c) is the given relation is Transitive?	
9	Write C++ Program to implement Prim's Algorithm.	
10	Write a C++ Program to check whether a given graph is bipartite or not.	

Course Outcomes		**Programme Outcome**
CO	Upon completion of the course the students would be able to:	
CO1	Remember the truth table using spreadsheets.	PO1, PO6
CO 2	Understand the programming basic function and knowledge about solving Logical problems.	PO2
CO 3	Apply the programming concept of spreadsheets for demorgan's theorem.	PO4, PO7
CO 4	Analyze the various set operations and problem.	PO6
CO 5	Know to demonstrate and implement prim's algorithms..	PO7, PO8

Text Book	
1	Jean-Paul Trembly & Manohar, R. (2017). Discrete Mathematics Structures with Applications to Computer Science. Tata Mc Graw-Hill.

Reference Books	
1.	Venkataraman, M.K., Sridharan, N., & Chandrasekaran, N. (2009). *Discrete Mathematics*. National Publishing co.

Web Resources	
1.	https://mathworld.wolfram.com/DiscreteMathematics.html

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO 3	PS O4	PSO 5	PSO6
CO1	**3**	**2**	**1**	**-**	**-**	**1**
CO2	**2**	**2**	**2**	**1**	**-**	**-**
CO3	**3**	**1**	**1**	**-**	**1**	**-**
CO4	**1**	**2**	**1**	**2**	**2**	**1**
CO5	**3**	**2**	**1**	**2**	**3**	**2**
Weightage of course contributed to each PSO	12	9	6	5	6	4

Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCAA4	STATISTICS METHODS AND ITS APPLICATIONS	Allied	3	-	-	-	3	3	25	75	100

Course Objective	
CO 1	Describe the fundamental concepts of collecting and presenting statistical data.
CO 2	Understand the measures of central tendency and dispersion
CO 3	Describe the concept and Measures of Skewness, Kurtosis and Moments.
CO 4	Classify the insights of correlation and Concurrent deviation method.
CO 5	Demonstrate the regression.

UNIT	Details	No. of Hours
UNIT I	**Collection and Presentation of Statistical Data**: Nature, Scope and Limitations of Statistics – Data sources – Methods of collection of statistical data – Census – Sample Survey – Measurement of Scales – Nominal, Ordinal, Interval and Ratio scales – Classification and Tabulation – Formation of frequency distribution – Cumulative frequency distribution – Diagrammatic and Graphical representation of Data.	6
UNIT II	**Measures of Central Tendency and Dispersion:** Arithmetic mean, Median, Mode, Geometric mean and Harmonic mean for raw and grouped data – Properties – Quartiles, Deciles and Percentiles – Absolute and relative measures of Dispersion – Range – Quartile deviation – Mean deviation - Standard deviation – Coefficient of Variation – Lorenz Curve.	6
UNIT III	**Measures of Skewness, Kurtosis and Moments**: Definition – Calculation of Karl Pearson's, Bowley's and Kelly's coefficient of Skewness – Moments – Raw and Central Moments – Relation between raw and central moments – Measures of Skewness and Kurtosis 15 based on Moments.	6
UNIT IV	**Correlation:** Definition of Correlation – Types of correlation – Methods of correlation – Scatter diagram – Karl Pearson's correlation coefficient – Spearman's rank correlation coefficient – Properties – Concurrent deviation method – Correlation coefficient for ungrouped and grouped bivariate data.	6
UNIT V	**Regression:** Meaning of Regression – Regression lines – Regression coefficients – Regression coefficients for ungrouped and grouped bivariate data – Properties of regression coefficient – Finding the two regression equations of X on Y and Yon X and estimating the unknown values of X and Y.	6
	Total	**30**

	Course Outcomes	Programme Outcome
CO	Upon completion of the course the students would be Able to:	
CO 1	Remember the fundamental concepts of collecting and presenting statistical data.	PO1, PO6
CO 2	Understand the measures of central tendency and dispersion.	PO2
CO 3	Describe the concept and and Measures of Skewness, Kurtosis and Moments.	PO4, PO7
CO 4	Analyze the correlation and Concurrent deviation method.	PO6
CO 5	Understand the use of regression.	PO7, PO8

Text Book	
1	Gupta S. P (2002), Statistical Methods, Sultan Chand and Sons, New Delhi.
2	Gupta S. C and Kapoor V. K, Fundamentals of Mathematical Statistics, Sultan Chand and Sons, New Delhi.
3	Goon A. M, Gupta M. K and Dasgupta B (2008), Fundamentals of Statistics, (Vol. - I), World Press Ltd, Calcutta.
4	Bhat B. R, Srivenkataramana T and Madhava Rao K. S (1996), Statistics a Beginner's Text, (Vol. – I), New Age International Publishers, New Delhi.
Reference Books	
1.	Hogg R. V and Craig A. T (2006), Introduction to Mathematical Statistics, MacMillan, London
2	Saxena H. C, Elementary Statistics, Sultan Chand and Sons, New Delhi.
3	Sancheti D. C and V.K Kapoor, Statistics, Sultan Chand and Sons, New Delhi.
4	Agarwal B. L (1996), Basic Statistics (Third Edition), New Age International Publishers, New Delhi.
Web Resources	
1.	https://www.tutorialspoint.com/statistics/data_collection.htm
2	https://www.surveysystem.com/correlation.htm
3	https://www.investopedia.com/terms/r/regression.asp
4	https://course-notes.org/statistics/sampling_theory

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO 3	PS O4	PSO 5	PSO6
CO1	**3**	**2**	**1**	**-**	**-**	**1**
CO2	**2**	**2**	**2**	**1**	**-**	**-**
CO3	**3**	**1**	**1**	**-**	**1**	**-**
CO4	**1**	**2**	**1**	**2**	**2**	**1**
CO5	**3**	**2**	**1**	**2**	**3**	**2**
Weightage of course contributed to each PSO	**12**	**9**	**6**	**5**	**6**	**4**

Strong-3 M-Medium-2 L-Low-1

	Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
										CIA	External	Total
	23BCAAP4	Computer-Oriented Statistical Methods Lab	Allied Lab	-	-	2	-	2	2	25	75	100

	Course Objective		
	CO1	To introduce basic statistical methods for the analysis of significance differences in data using C++ programming Language through Excel.	
	CO2	To introduce various statistical method such as regression, Skewness, etc.	
	CO3	Understand and perform correlation coefficient.	
	CO4	Classify the linear regression.	
	CO5	Demonstrate and compute multi regression.	
	S. No	**List of Lab Programs**	**No. of Hours**
	1	Write a C++ program to execute the basic commands of an array.	**30**
	2	Write a C++ program to Create a Matrix and Perform the operations addition, inverse, transpose, and multiplication operations.	
	3	Write a C++ program to Execute the statistical functions: mean, median, mode.	
	4	Write a C++ program to Execute the statistical functions: Standard Deviation, variance, and covariance.	
	5	Write a C++ program to draw the skewness.	
	6	Write a C++ program to obtain the correlation coefficient	
	7	Write a C++ program to perform the binomial and normal distribution on the data.	
	8	Write a C++ program to Perform the Linear Regression.	
	9	Write a C++ program to Compute the Least squares means.	
	10	Write a C++ program to Compute the Multi Regression.	
	Course Outcomes		**Programme Outcome**
	CO	Upon completion of the course the students would be able to:	
	CO1	Students will able to understand statistical methods for computer analysis	PO1, PO6
	CO 2	Students will able to programming with application of Statistical methods	PO2
	CO 3	Apply and perform correlation coefficient.	PO4, PO7
	CO 4	Analyze the various linear regression program.	PO6
	CO 5	Know to compute multi regression.	PO7, PO8
	Text Book		
	1	Goyal, M. (2008). *Computer-based Numerical & Statistical Techniques*. Laxmi Publications, Ltd.	
	2	Gupta, S. C., & Kapoor, V. K. (2020). *Fundamentals of Mathematical*. Sultan Chand statistics & Sons.	
	Reference Books		
	1.	Walpole, R. E., Myers, R. H., Myers, S. L., & Ye, K. (1993). *Probability and Statistics for Engineers and Scientists* (Vol. 5). New York: Mac-millan.	
	Web Resources		
	1.	https://www.tutorialspoint.com/statistics/data_collection.htm	
	2	https://www.surveysystem.com/correlation.htm	

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCAA5	**Graph Theory and its Applications**	EC - 4 Allied	3	-	-	-	3	3	25	75	100

Learning Objectives	
LO1	Definition of Graph, sub graph their representations, degree and algebraic operations.
LO2	Connected graphs, weighted graphs and shortest paths
LO3	Trees: Characterizations, spanning tree, minimum spanning trees
LO4	Eulerian and Hamiltonian graphs: Characterization, Necessary and sufficient conditions
LO5	Special classes of graphs: Bipartite graphs, line graphs, chordal graphs.

UNIT	**Contents**	**No. of Hours**
UNIT I	**INTRODUCTION**: Graph-mathematical definition- Introduction – sub graphs –Walks, paths, Circuits connectedness- Components- Euler Graphs- Hamiltonian paths and circuits-Trees- properties of Trees- Distance and centres in Tree- Rooted and Binary Trees	15
UNIT II	**CONNECTIVITY AND PLANARITY:** Introduction to circuits - cut set- properties of cut set- All cut sets –connectivity and separability – Network Flows - 1-Isomorphism - 2-Isomorphism- Combinatorial and Geometric graphs- Planar Graphs – Different representation of planar graph.	
UNIT III	**COLORING AND DIRECTED GRAPH:** Basics of Colouring &Chromatic number – Chromatic partitioning – Graph Colouring – four colour Problem Chromatic polynomial - Matching – Covering - Directed graphs - Types of Directed Graphs – Diagraphs and binary relations – Directed paths- Euler Graph.	15
UNIT IV	**MATRIX REPRESENTATION IN GRAPH:** Matrix representation of graphs, Sub graphs& Quotient Graphs, Transitive Closure digraph, Euler's Path & Circuit (only definitions and examples), spanning Trees of Connected Relations, Prim's Algorithm to construct Spanning Trees, Weighted Graphs, Minimal, Spanning Trees by Prim's Algorithm & Kruskal's Algorithm.	15
UNIT V	**APPLICATIONS OF GRAPH:** Travelling Sales Person Problem with Directed and Un directed Graph, - Graph with n vertices and k colours- Shortest path from one to many Cities with directed graph- Shortest Paths with Un directed Graphs-Connected Components.	15
	Total	**75**

Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
CO1	To Introduce the fundamental concepts in graph theory Graphs, subgraphs, walks, Euler graphs, Hamiltonian Paths Tree Properties, Hamiltonian paths and circuits.	PO1,PO6
CO2	Understanding the concepts of Circuits, Cut set and its Properties, Network Flows, Isomorphism and Combinatorial and Planar Graphs.	PO2
CO3	Applying the concept of Colouring with Chromatic Number, Directed Graphs, Matching, Covering Pattern and Euler Graphs.	PO2,PO4
CO4	Analyzing the Various Concepts of Representation of Graphs, Euler Paths Circuit, Kruskals and Prims Algorithms, Connected Components.	PO4,PO6
CO5	Implementation of an application using All Types of Graphs and evaluate the Applications with travelling sales person Problem, K colour Problem with n vertices in a Graph and Shortest Path finding Problem using Directed and Undirected Graphs.	PO5,PO6

Text Book	
1	Narsingh Deo , " Graph Theory with Application to Engineering and Computer Science" Prentice Hall of India 2010(Reprint)
2	Rosen H "Discrete Mathematics and Its Application " Mc Graw Hill , 2007

Reference Books	
1.	Discrete Maths for Computer Scientists & Mathematicians by Mott, Kandel, Baker
2.	Clark J and Holton DA " First look at Graph Theory" Allied Publishers 1995

Web Resources	
1.	Web resources from NDL Library, E-content from open source libraries

2.	1) https://d3gt.com/ 2) https://www.coursera.org/courses?query=graph%20theory

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	2	3
CO 3	3	3	3	3	2	3
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	15	13	15	13	15

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCA AP5	**Graph Theory and its applications Lab**	EC – 5 Allied	-	-	2	-	2	2	25	75	100

Learning Objectives	
LO1	Definition of Graph, sub graph their representations, degree and algebraic operations.
LO2	Connected graphs, weighted graphs and shortest paths
LO3	Special classes of graphs: Bipartite graphs, line graphs, chordal graphs.
LO4	Trees: Characterizations, spanning tree, minimum spanning trees
LO5	Eulerian and Hamiltonian graphs: Characterization, Necessary and sufficient conditions

Sl. No.	**Details**	**No. of Hours**
1	Write a Program to find the number of vertices, even vertices, odd vertices and number of edges in a Graph.	60
2	Write a Program to find connectivity in a graph between two vertices is directed or indirected.	
3	Write a program to find degree of the vertices in a graph.	
4	Write a Program to Find Minimum Spanning tree Using Prim's Algorithm	
5	Write a Program to Find Minimum Spanning tree Using Kruskal's Algorithm	
6	Write a Program to find Shortest Path between 2 Vertices using Dijkstra Algorithm	
7	Write a Program to find Shortest Path between every pair of vertices in a graph using Floyd-Warshall's Algorithm.	
8	Write a Program to implement Graph Colouring.	
	Total	**60**

Course Outcomes		**Programme Outcome**
CO	To Introduce the fundamental concepts in graph theory Graphs, sub graphs, walks, Euler graphs, Hamiltonian Paths Tree Properties, Hamiltonian paths and circuits.	
CO1	Understanding the concepts of Circuits, Cut set and its Properties, Network Flows, Isomorphism and Combinatorial and Planar Graphs.	PO1
CO2	Applying the concept of Colouring with Chromatic Number, Directed Graphs, Matching, Covering Pattern and Euler Graphs.	PO1, PO2
CO3	Analysing the Various Concepts of Representation of Graphs, Euler Paths Circuit, Kruskals and Prims Algorithms, Connected Components.	PO4, PO6
CO4	Implementation of an application using All Types of Graphs and evaluate the Applications with travelling sales person Problem, K colour Problem etc.	PO4, PO5, PO6
CO5	To Introduce the fundamental concepts in graph theory Graphs, subgraphs, walks, Euler graphs, Hamiltonian Paths Tree Properties, Hamiltonian paths and circuits.	PO3, PO5

Text Book	
1	Narsingh Deo , " Graph Theory with Application to Engineering and Computer Science" Prentice Hall of India 2010 (Reprint)
2	Rosen H "Discrete Mathematics and Its Application " Mc Graw Hill , 2007

Reference Books	
1.	Discrete Maths for Computer Scientists & Mathematicians by Mott, Kandel, Baker
2.	Clark J and Holton DA " First look at Graph Theory" Allied Publishers 1995

Web Resources	
1.	Web resources from NDL Library, E-content from open source libraries
2.	1) https://d3gt.com/ 2) https://www.coursera.org/courses?query=graph%20theory

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCAA6	Computer Oriented Numerical Methods	EC – 6 Allied	3	-	-	-	3	3	25	75	100

Learning Objectives	
LO1	To introduce the various topics in Numerical methods.
LO2	To make understand the fundamentals of algebraic equations.
LO3	To apply interpolation and approximation on examples.
LO4	To solve problems using numerical differentiation and integration.
LO5	To solve linear systems, numerical solution of ordinary differential equations.

UNIT	Contents	No. of Hours
UNIT I	**FUNDAMENTALS OF ALGEBRAIC EQUATION**: Solution of algebraic and transcendental equations-Bisection method – Fixed point iteration method – Newton Raphson method –linear system of equations – Gauss elimination method – Gauss Jordan method .	15
UNIT II	**ITERATIVE, INTERPOLATION AND APPROXIMATION:** Iterative methods - Gauss Jacobi and Gauss Seidel – Eigen values of a matrix by Power method and Jacobi's method for symmetric matrices. Interpolation with unequal intervals – Lagrange's interpolation – Newton's divided difference interpolation	
UNIT III	**INTERPOLATION WITH EQUAL INTERVAL:** Difference operators and relations. - Interpolation with equal intervals – Newton's forward and backward difference formulae.	15
UNIT IV	**NUMERICAL DIFFERENTIATION AND INTEGRATION:** Approximation of derivatives using interpolation polynomials – Numerical integration using Trapezoidal, Simpson's 1/3 rule	15
UNIT V	**INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS:** Single step methods – Taylor's series method – Euler's method – Modified Euler's method - Runge Kutta method for solving(first, second , Third and 4th) order equations – Multi step methods	15
	Total	**75**

Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
CO1	Know how to solve various problems on numerical methods	PO1, PO6
CO2	Use approximation to solve problems	PO2
CO3	Differentiation and integration concept are applied	PO2, PO4
CO4	Apply , direct methods for solving linear systems	PO4, PO6
CO5	Numerical solution of ordinary differential equations	PO5, PO6

Text Book

1. Balagurusamy, E., Numerical Methods, Tata McGraw Hill, 1999.
2. Rajaraman V., Computer Oriented Numerical Methods, 3rd Edition, Prentice Hall India, New Delhi, 1998.

Reference Book

1. Stoor, Bullrich, Computer Oriented Numerical Methods, Springer-Verlag, 1998.
2. Krishnamurthy, E.V., Sen, S.K., Computer Based Numerical Algorithms, East West Press, 1998.
3. Jain, M.K., Iyengar, S.R.K., Jain R.K., Numerical Methods : Problems and Solutions, New Age Int.(P) Ltd., New Delhi, 1997.
4. Jain, M.K., Iyengar, S.R.K., Jain R.J., Numerical Methods for Scientific and Engineering Competition, New Age Int. (P)Ltd., New Delhi, 1997

Web Resources

1. https://www.udemy.com/course/computer-oriented-numerical-techniques/

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	2	3
CO 3	3	3	3	3	2	3
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	15	13	15	13	15

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCAAP6	**Computer Oriented Numerical Methods Lab (using C)**	EC – 7 Allied	-	-	2	-	2	2	25	75	100

Learning Objectives	
LO1	To introduce the various topics in Numerical methods.
LO2	To make understand the fundamentals of algebraic equations.
LO3	To apply interpolation and approximation on examples.
LO4	To solve problems using numerical differentiation and integration.
LO5	To solve linear systems, numerical solution of ordinary differential equations.

	Details	**No. of Hours**
1	Write a C Program to find the roots of non-linear equation using bisection method.	60
2	Write a C Program to find the roots of non-linear equation using newton's method	
3	Write a C Program to solve the system of linear equations using gauss - elimination method.	
4	Write a C Program to integrate numerically using Trapezoidal Rule.	
5	Write a C Program to integrate numerically using Simpson's rule.	
6	Write a C Program for Newtons forward difference.	
7	Write a C Program to implement Lagrange's interpolation method for finding f(x) for a given x	
8	Write a C Program to find the largest eigen value of a matrix by power - method.	
9	Write a C Program to find numerical solution of ordinary differential equations by euler's method.	
10	Write a C Program to find numerical solution of ordinary differential equations by runge- kutta method.	
	Total	**60**

Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
CO1	Know how to solve various problems on numerical methods	PO1
CO2	Use approximation to solve problems	PO1, PO2
CO3	Differentiation and integration concept are applied	PO4, PO6
CO4	Apply , direct methods for solving linear systems	PO4, PO5, PO6
CO5	Numerical solution of ordinary differential equations	PO3, PO5

Text Book	
1	Balagurusamy, E., Numerical Methods, Tata McGraw Hill, 1999.
2	Rajaraman V., Computer Oriented Numerical Methods, 3rd Edition, Prentice Hall India, New Delhi, 1998.

Reference Books	
1.	Stoor, Bullrich, Computer Oriented Numerical Methods, Springer-Verlag, 1998.
2.	Krishnamurthy, E.V., Sen, S.K., Computer Based Numerical Algorithms, East West Press, 1998.
3.	Jain, M.K., Iyengar, S.R.K., Jain R.K., Numerical Methods: Problems and Solutions, New Age Int. (P) Ltd., New Delhi, 1997.
4.	Jain, M.K., Iyengar, S.R.K., Jain R.J., Numerical Methods for Scientific and Engineering Competition, New Age Int. (P) Ltd., New Delhi, 1997

Web Resources	
1.	https://www.udemy.com/course/computer-oriented-numerical-techniques/

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	2	3
CO 3	3	3	3	3	2	3
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	15	13	15	13	15

S-Strong-3 M-Medium-2 L-Low-1

Allied paper offered by B.Sc. Information Technology from 2023-2024 onwards

Subject Code	Subject Name	Category	L	T	P	S	C	Inst. Hours	Marks		
									CIA	External	Total
	Digital Logic Fundamentals	Allied	3	-	-	-	3	3	25	75	100

Learning Objective	
LO1	It aims to train the student to the basic concepts of Digital ComputerFundamentals
LO2	To impart the in-depth knowledge of logic gates, Boolean algebra, combinational circuits and sequential circuits.
	Contents
UNIT I	Number Systems and Codes: Number System – Base Conversion – Binary Codes – Code Conversion. Digital Logic: Logic Gates – Truth Tables – Universal Gates.
UNIT II	Boolean Algebra: Laws and Theorems – SOP, POS Methods – Simplification of Boolean Functions – Using Theorems, K-Map, Prime – Implicant Method – Binary Arithmetic: Binary Addition – Subtraction – Various Representations of Binary Numbers – Arithmetic Building Blocks – Adder – Subtractor.
UNIT III	Combinational Logic: Multiplexers – Demultiplexers – Decoders –Encoders – Code Converters – Parity Generators and Checkers.
UNIT IV	Sequential Logic: RS, JK, D, and T Flip-Flops – Master-Slave Flip-Flops. Registers: Shift Registers – Types of Shift Registers.
UNIT V	Counters: Asynchronous and Synchronous Counters - Ripple, Mod, Up- Down Counters– Ring Counters. Memory: Basic Terms and Ideas – Typesof ROMs – Types of RAMs.
Course Outcomes	
CO1	Identify the logic gates and their functionality.
CO2	Perform number conversions from one system to another system
CO3	Understand the functions of combinational circuits
CO4	Perform number conversions.
CO5	Perform Counter design and learn its operations.

Text Book	
1	D.P.Leach and A.P.Malvino, *Digital Principles and Applications* – TMH – FifthEdition – 2002.
Reference Books	
1.	V.Rajaraman and T.Radhakrishnan, *Digital Computer Design*, Prentice Hallof India, 2001
2.	M. Moris Mano, *Digital Logic and Computer Design*, PHI, 2001.
3.	T.C.Bartee, *Digital Computer Fundamentals*, 6th Edition, Tata McGraw Hill,1991.

Allied			L	T	P	C	H/W
Subject code:		**DIGITAL ELECTRONICS LAB**	**-**	**-**	**2**	**2**	**2**

Objectives	● To Understand the Digital Electronics Practically ● To know how to solve gates and other functions.

1. AND, OR and NOT Gate using Truth Table
2. Universality of NAND & NOR gates.
3. Verification of Boolean laws using NAND gates (Associative, Commutative & Distributive Laws)
4. Verification of Boolean laws using NOR gates (Associative, Commutative & Distributive Laws)
5. Sum of Products using NAND gates and Product of Sums using NOR Gates.
6. 4-bit binary parallel adder and Subtractor IC 7483
7. Counter using IC 7473
8. Study of RS, D, T and JK Flip-Flops with IC's.
9. Study of Encoder & Decoder.
10. Study of Multiplexer & De-Multiplexer.
11. Half and Full Adder using Simple & NAND Gates.
12. Half and Full Subtractor using Simple & NAND Gates.

Outcomes	● Students were able to solve simple gate functions. ● Students were able to solve and Design circuits using IC.

Subject Code	Subject Name	Category	L	T	P	S	C	Inst. Hours	Marks		
									CIA	External	Total
	Internet and Web Design	Allied	3	-	-	-	3	3	25	75	100
Learning Objectives											
LO1	To learn more about markup languages										
LO2	To understand various web services										

Unit -I	Internet and the World Wide Web: What is Internet? Introduction to internet and its applications, E-mail, telnet, FTP, e-commerce, video conferencing, e-business. Internet service providers, domain name server, internet address, World Wide Web and its evolution, uniform resource locator (URL), browsers, search engine, web server, HTTP protocol, Routers, Gateways, Bridge, Switches, Subnet and Intranet.
Unit-II	HTML: Introduction, Why HTML5? Formatting text by using tags, using lists and backgrounds, Creating hyperlinks and anchors. Style sheets, CSS formatting text using style sheets, formatting paragraphs using style sheets. Creating navigational aids: planning site organization, creating text based navigation bar, creating graphics based navigation bar, creating graphical navigation bar, creating image map, redirecting to another URL, creating division based layouts: HTML5 semantic tags, creating divisions, creating HTML5 semantic layout, positioning and formatting divisions.
Unit -III	Creating tables: creating simple table, specifying the size of the table, specifying the width of the column, merging table cells, using tables for page layout, formatting tables: applying table borders, applying background and foreground fills, changing cell padding, spacing and alignment, creating user forms: creating basic form, using check boxes and option buttons, creating lists, additional input types in HTML5, Incorporating sound and video: audio and video in HTML5, HTML multimedia basics, embedding video clips, incorporating audio on web page.
Unit -IV	Java Script: Introduction, Client-Side JavaScript, Server-Side JavaScript, JavaScript Objects, JavaScript Security, Operators , Conditional and Looping Statements-Break, continue, User Defined Function. Array, Date, Math, Number, Object, String, regExp.
Unit =V	Document and its associated objects: document, Link, Area, Anchor, Image, Applet, Layer . Events and Event Handlers : General Information about Events,Defining Event Handlers, event, onAbort, onBlur, onChange, onClick,onDblClick, onDragDrop, onError, onFocus, onKeyDown,onKeyPress, onKeyUp, onLoad, onMouseDown, onMouseMove,onMouseOut, onMouseOver, onMouseUp, onMove, onReset,onResize, onSelect, onSubmit, onUnload.

Reference and Textbooks:

- Web Design The Complete Reference-Thomas Powell -Tata McGraw Hill
  HTML5 Step by Step -Faithe Wempen-Microsoft Press
- HTML 5 Black Book-2nd Edition - Dreamtech Press -
  2016Head First HTML 5 Programming-Eric Freeman-
  O'Reilly
- Web Technologies--A Computer Science Perspective-Jeffrey C. Jackson- Pearson Education.

Course Outcome	
CO1	Understand web essential concepts and to design simple web pages using markup language.
CO2	Understand style properties and able to build dynamic web pages using scripting language.
CO3	Understand Java Script Basics
CO4	Understand Regular Expressions
CO5	Understand Event handling Techniques

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	3	3	3	2	3	2
CO3	3	3	3	3	3	2
CO4	3	3	3	3	3	2
CO5	3	3	3	2	3	2

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Allied LAB	T/P	C	H/W
	Web Designing Lab	**P**	**2**	**2**

1. Design a web page using different text formatting tags.
2. Design a web page with links to different pages and allow navigation between web pages.
3. Design a web page demonstrating all Style sheet types .
4. Design a web page with Image maps.
5. Design a web page demonstrating different semantics.
6. Design a web page with different tables.
7. Design a web page with a form that uses all types of input controls.
8. Design a web page embedding with multimedia features.
9. Write a JavaScript program to find the factorial value.
10. Write a JavaScript program to print the Fibonacci series.
11. Design a form and validate all the controls placed on the form using Java Script.
12. Write a JavaScript program to display all the prime numbers between 1 and 100.
13. Write a JavaScript program to accept a number from the user and display the sum of its digits.
14. Write a program in JavaScript to accept a sentence from the user and display the number of words in it. (Do not use split () function).
15. Write a java script program to design simple calculator.

Outcomes	• Students can create the webpage with formatting tags. • Students can design the page with style sheets • Students can use java script elements for client side validation

Subject Code	Subject Name	Category	L	T	P	S	C	Inst. Hours	Marks		
									CIA	External	Total
	Microprocessor and Microcontroller	Allied	3	-	-	-	3	3	25	75	100

Learning Objectives	
LO1	To introduce the internal organization of Intel 8085 Microprocessor.
LO2	To know about various instruction sets and classifictions
LO3	To enable the students to write assembly language programs using 8085.
LO4	To interface the peripheral devices to 8085 using Interrrupt controller and DMA interface.
LO5	To provide real-life applications using microcontroller.

UNIT	**Contents**	**No. of Hours**
I	Microprocessor Architecture and its operations – Microprocessor initiated operations and 8085 Bus organization – Internal Data operations and 8085 registers - Peripheral or External initiated operations.	9
II	8085 Microprocessor – Pinout and Signals – Functional block diagram - 8085 Instruction Set and Classifications.	9
III	The 8085 Interrupts – RIM AND SIM instructions-8259 Programmable Interrupt Controller-Direct Memory Access (DMA) and 8257 DMA controller.	9
IV	Introduction to Microcontroller - Microcontroller Vs Microprocessor - 8051 Microcontroller architecture - 8051 pin description.	9
V	Timers and Counters – Operating Modes- Control Registers. Interrupts – Interrupts in 8051 - Interrupts Control Register – Execution of interrupt.	9
	Total	**45**

Course Outcomes		**Programme Outcomes**
CO	On completion of this course, students will	
CO1	Remember the Basic binary codes and their conversions. Binary concepts are used in Microprocessor programming and provide a good understanding of the architecture of 8085o introduce the internal organization of Intel 8085 Microprocessor..	PO1
CO2	Understanding the 8085 instruction set and their classifications, enables the students to write the programs easily on their own using different logic	PO1,PO2
CO3	Applying different types of instructions to convert binary codes and analyzing the outcome. The instruction set is applied to develop programs on multibyte arithmetic operations.	PO4,PO6
CO4	Analyze how peripheral devices are connected to 8085 using Interrupts and DMA controller.	PO4,PO5,PO6
CO5	An exposure to create real time applications using microcontroller.	PO3,PO6

Text Book	
1	R. S. Gaonkar- "Microprocessor Architecture- Programming and Applications with 8085"- 5th Edition- Penram International Publications,2009. [For unit I to unit IV]
2	Soumitra Kumar Mandal -"Microprocessors and Microcontrollers – Architectures, Programming and Interfacing using 8085, 8086, 8051", Tata McGraw Hill Education Private Limited. [for unit V].

Reference Books	
1.	Mathur- "Introduction to Microprocessor"- 3rd Edition- Tata McGraw-Hill -1993.

2.	Raj Kamal - “Microcontrollers: Architecture, Programming, Interfacing and System Design”, Pearson Education, 2005.
3.	Krishna Kant, “Microprocessors and Microcontrollers – Architectures, Programming and System Design 8085, 8086, 8051, 8096”, PHI, 2008
Web Resources	
1.	E-content from open source libraries
2.	https://www.bing.com/, https://theopennotes.in/

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	3	3	3	2	3	2
CO3	3	3	3	3	3	2
CO4	3	3	3	3	3	2
CO5	3	3	3	2	3	2

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
Allied Lab	**Microprocessor and microcontroller Lab**	Allied	-	-	2	-	2	2	25	75	100

Learning Objectives	
LO1	To introduce the internal organization of Intel 8085 Microprocessor.
LO2	To know about various instruction sets and classifications.
LO3	To enable the students to write assembly language programs using 8085.
LO4	To interface the peripheral devices to 8085 using Interrrupt controller and DMA interface.
LO5	To provide real-life applications using microcontroller.

	Details	**No. of Hours**
	List of Exercises:	
1	Write an assembly language program to perform 8 - bit addition	30
2	Write an assembly language program to perform 16 - bit addition	
3	Write an assembly language program to perform 8 - bit subtraction	
4	Write an assembly language program to perform 8 - bit multiplication	
5	Write an assembly language program to perform 8 - bit division	
6	Write an assembly language program to searching for an element in an array.	
7	Write an assembly language program to perform Ascending and Descending order.	
8	Write an assembly language program to find the largest and smallest elements in an array.	
9	Write an assembly language program to reversing array elements.	
	Total	**30**

Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
CO1	Remember the Basic binary codes and their conversions. Binary concepts are used in Microprocessor programming and provide a good understanding of the architecture of 8085o introduce the internal organization of Intel 8085 Microprocessor..	PO1
CO2	Understanding the 8085 instruction set and their classifications, enables the students to write the programs easily on their own using different logic	PO1,PO2

CO3	Applying different types of instructions to convert binary codes and analyzing the outcome. The instruction set is applied to develop programs on multibyte arithmetic operations.	PO4,PO6
CO4	Analyze how peripheral devices are connected to 8085 using Interrupts and DMA controller.	PO4,PO5,PO6
CO5	An exposure to create real time applications using microcontroller.	PO3,PO5
Text Book		
1	R. S. Gaonkar- "Microprocessor Architecture- Programming and Applications with 8085"- 5th Edition- Penram International Publications,2009. [For unit I to unit IV]	
2	Soumitra Kumar Mandal -"Microprocessors and Microcontrollers – Architectures, Programming and Interfacing using 8085, 8086, 8051", Tata McGraw Hill Education Private Limited. [for unit V].	
Reference Books		
1.	Mathur- "Introduction to Microprocessor"- 3rd Edition- Tata McGraw-Hill -1993.	
2.	Raj Kamal - "Microcontrollers: Architecture, Programming, Interfacing and System Design", Pearson Education, 2005.	
3.	Krishna Kant, "Microprocessors and Microcontrollers – Architectures, Programming and System Design 8085, 8086, 8051, 8096", PHI, 2008	
Web Resources		
1.	E-content from open source libraries	
2.	https://www.bing.com/	

Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	2	3	3	2
CO2	3	3	2	3	3	2
CO3	3	3	3	3	3	2
CO4	3	3	2	3	3	2
CO5	3	3	2	3	3	2
Weightage of course contributed to each PSO	15	14	11	15	15	10

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	C	Inst. Hours	Marks		
									CIA	External	Total
	MULTIMEDIA AND ITS APPLICATIONS	Allied	3	-	-	-	3	3	25	75	100

Learning Objectives	
LO1	To learn multimedia basics.
LO2	To know about Multimedia applications

Unit - I	Multimedia Definitions – Delivering - Uses of multimedia. **Text :** The Power of Meaning – About Fonts and Faces –Using Text in Multimedia – Computers and Text – Font Editing and Design Tools – Hypermedia and Hypertext.
Unit -II	**Images:** Making Still Images –Understating natural light and color- Image File formats. **Sound:** The Power of Sound – Multimedia System Sounds- Digital Audio - MIDI Versus Digital Audio – Making MIDI Audio – Audio file formats – Adding Sound– Copyright Issues.
Unit – III	**Animation:** The Power of motion – Principles of Animation – Making Animation. **Video:** Using video – How it works – Broadcast Video Standards – Integrating Computers and Television – shooting and Editing Video – Video Tips – Recording Formats – Digital video.
Unit – IV	Making Multimedia - Hardware Peripherals: Connection - Memory and storage Devices – Input / Output Devices - Communication Devices - Software-Editing tools for Text, Image, Sound, Animation and Video- Multimedia Skills-Designing for the World Wide Web.
Unit - V	**Adobe Animate**: Animate Interface-Managing workspaces and Panels- Customizing the tools and Timeline panels- Animating with Diverse Techniques-Working with Shapes-Tweens-Symbols-Interactive Motion Graphics for the Web-Character design through Layer.

TEXT BOOK:

- Multimedia: Making It Work-Ninth Edition-Tay Vaughan-McGraw Hill

  Mastering Adobe Animate 2021-Joseph Labrecque - Packt Publishing Limited
- Multimedia Application and Web Designing - Dinesh Maidasani- Laxmi Publications
- Ultimedia Programming: A Practical Approach- Dr. Siddhartha Bhattacharyya & Dr. Paramartha Dutta - Vikas Publishing

Course Outcome	
CO1	Understand the multimedia usage and text elements
CO2	Understand the Image and sound elements of multimedia
CO3	Understand Animation and video recording formats
CO4	Understand the requirements to create the multimedia application
CO5	Understand to create the animation using Adobe animate

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	3	3	3	2	3	2
CO3	3	3	3	3	3	2
CO4	3	3	3	3	3	2
CO5	3	3	3	2	3	2

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
Allied Lab	**MULTIMEDIA LAB**	Allied	-	-	2	-	2	2	25	75	100

LIST OF PRACTICAL PROGRAMS

1. Draw an animation to show a bouncing ball.
2. Draw an animation to show a moving stick man.
3. Draw an animation with banana.
4. Draw an animation to show sunrise and sunset.
5. Draw an animation to show a disappearing house.
6. Draw an animation to show two boats sailing in river
7. Draw an animation to show a scene of cricket match.
8. Draw an animation to help teach a poem or a song
9. Draw an animation to show cartoon with a message
10. Draw an animation to move Butterfly from one flower to other.
11. Draw an animation for health tips.
12. Draw an animation for Kids Mathematics.
13. Make a movie showing Shape Tweening.
14. Make a movie showing Motion Tweening.
15. Add sound and button to the movie.

Outcomes	● Students can create the Animation. ● Students can add sound effects