

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

B.C.A. – PROGRAMME STRUCTURE

Sem.	Part	Course Code	Title of the Course	Cr.	Hrs./ Week	Marks		Total	
						Int.	Ext.		
I	I	711T	Tamil/other languages – I	3	6	25	75	100	
	II	712E	English – I	3	6	25	75	100	
	III	7BCA1C1	Core – I – C and Data Structure	4	6	25	75	100	
		7BCA1P1	Core–II–C and Data Structure Lab	4	6	40	60	100	
			Allied – I (Theory only) (or)	5	5	25	75	100	
			Allied – I (Theory cum Practical)	4	3	15	60	75	
			Allied Practical – I	-	2**	--	--	---	
	IV	7NME1A / 7NME1B / 7NME1C	(1) Non-Major Elective – I – (A)தமிழ் மொழியின் அடிப்படைகள் /(B) இக்கால இலக்கியம் / (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	7BCA2C1	Core – III – Programming in C++	4	6	25	75	100	
		7BCA2P1	Core –IV –Programming in C++ Lab	4	5	40	60	100	
			Allied – II (Theory only) (or)	5	5	25	75	100	
			Allied– II (Theory cum Practical)	4	3	15	60	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	731T	Tamil/other languages – III	3	6	25	75	100	
	II	732E	English – III	3	6	25	75	100	
	III	7BCA3C1	Core – V – Database Management Systems	4	5	25	75	100	
		7BCA3P1	Core – VI – Oracle Lab	4	5	40	60	100	
			Allied – III (Theory only) (or)	5	5	25	75	100	
			Allied–III (Theory cum Practical)	4	3	15	60	75	
			Allied Practical – II	-	2**	--	--	---	
	IV	7NME3A / 7NME3B / 7NME3C	(1) Non-major Elective – II – (A)இலக்கியமும்மொழிப்பயன்பாடும்/ (B) பழந்தமிழ் இலக்கியங்களும் இலக்கியவரலாறும்/ (C) Effective Employability Skills	2	1	25	75	100	
			(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	7BCA4C1	Core – VII – Java Programming	4	4	25	75	100	
	III	7BCA4P1	Core–VIII–Java Programming Lab	4	5	40	60	100	
	III		Allied – IV(Theory only) (or)	5	5	25	75	100	
			Allied–IV (Theory cum Practical)	4	3	15	60	75	
			Allied Practical - II	2	2	20	30	50	
	IV	7SBS4B1/ 7SBS4B2/ 7SBS4B3	(2) Skill Based Subjects – II	2	2	25	75	100	
		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	7BCA5C1	Core – IX – •NET Programming	4	6	25	75	100	
	III	7BCA5P1	Core X – •NET Programming Lab	4	5	40	60	100	
	III	7BCA5C2	Core – XI – Computer System Architecture	4	5	25	75	100	
	III	7BCAE1A/ 7BCAE1B	Elective–I–A) Web Design Technology (or) B) Design and Analysis of Algorithm	5	5	25	75	100	
	III	7BCAE2A/ 7BCAE2B	Elective–II– A) Computer Graphics (or) B) Operating System	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	7BCA6C1	Core – XII – Data Mining and Warehousing	4	5	25	75	100	
	III	7BCA6C2	Core – XIII – Computer Networks	4	5	25	75	100	
	III	7BCA6C3	Core – XIV – Software Engineering	4	5	25	75	100	
	III	7BCA6PR	Core – XV – Project	4	6	40	60	100	
	III	7BCAE3A/ 7BCAE3B	Elective–III–A) Open Source Lab (or) B) PC Assembling, Troubleshooting & System Management Lab	5	5	40	60	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.**

B.C.A.

I YEAR – I SEMESTER COURSE CODE: 7BCA1C1

CORE COURSE - I – C AND DATA STRUCTURE

Unit I

Introduction To Computers: – Types of Programming Languages – Introduction to C – Structure of a C programs – Constants - Variables – Data Types – Operators and Expressions – Input and Output Operations – Decision Making – Branching – Looping.

Unit II

Arrays: One and Two Dimensional Arrays – Character Strings: Declaring and Initializing String Variables – Reading Strings From Terminal – Writing Strings To Screen – Arithmetic Operations on Characters – String Handling Functions.

Unit III

User Defined Functions: Introduction – Need for User Defined Functions – The Form of C Functions – return values and their types – Calling a Function – Categories of Functions – Nesting of Functions – Recursion – Functions With Arrays – The Scope and Lifetime of Variables.

Structures and Unions: Structure Definition – Giving Values to Members – Structure Initialization – Arrays of Structures – Arrays Within Structures – Structures Within Structures – Structures And Functions – Unions.

Unit IV

Pointers: Introduction – Understanding Pointers – Accessing the Address of a Variable – Declaring and Initializing Pointers – Accessing a Variable through its Pointer.

File Handling: Defining and Opening a File – Closing a File – I/O Operations on Files – Error Handling During I/O Operation.

Unit V

Data Structure: Classification of Data Structures – Data Structure Operations – Abstract Data Type- Stack: definition, Stack as ADT – Queue: Definition, Queue as ADT - Linked List: Insertion into Linked List, Deletion into Linked List – Trees: Basic Terminology.

Text Books:

1. Programming in ANSI C – E.Balagurusamy, Tata McGrawHill Publishing Company Ltd, NewDelhi , Sixth Edition 2012.
2. Data Structures Book By Seymour Lipschutz, McGraw Hill Education, Publishing Company Ltd, NewDelhi, Third Edition 2010.

Books for Reference:

1. Programming with C – K.R.Venugopal, Sudeep.R Prasad Tata McGrawHill Publishing Company Ltd, NewDelhi.
2. Theory and problems of programming with C – Byron S.Gottfried, Schaum's outline series Tata McGrawHill Publishing Company Ltd, NewDelhi.
3. Programming in C D.Ravichandran ,New Age International publisher, 2009.



**I YEAR – I SEMESTER
COURSE CODE: 7BCA1P1**

CORE COURSE - II – C AND DATE STRUCTURE LAB

C Program

1. Write a program to perform the arithmetic operation.
2. Write a program to find whether the given number is palindrome or not.
3. Write a program to count the number of positive, negative and zero.
4. Write a program to sort the array in an ascending order.
5. Write a program to add the two matrixes.
6. Write a program to perform the string operation[length , compare, copy, concat, reverse]
7. Write a program to find sum of digits of a number using function.
8. Write a program for call by value and call by reference.
9. Write a program to use structure within union, display the contents of structure elements.
10. Write a program for declaring and initializing pointers.
11. Write a program add two numbers using pointer.
12. Write a program to read, write the text file using file handling method.

Data Structure Program

13. Write a program to implement on stack operation.
14. Write a program to implement on queue operation.
15. Write a program to create and display singly linked list.



**I YEAR – II SEMESTER
COURSE CODE: 7BCA2C1**

CORE COURSE - III – PROGRAMMING IN C++

Unit I

Principles of Object-Oriented Programming: Introduction and C++ – Tokens – Expressions - Control Structure – Function in C++.

Unit II

Classes and Objects: Introduction - Specifying a Class -Defining Member Function - C++ Program with Class - Making an Outside Function Inline - Nesting of Member Functions - Arrays within a Class - Memory Allocation for Objects - Static Data Members - Static Member Functions - Arrays of Objects - Objects as Function Arguments - Friendly Functions - Returning Objects.

Constructors and Destructors: Introduction - Constructors - Parameterized Constructors - Multiple Constructors in Class - Constructors with Default Arguments - Dynamic Initialization of Objects - Copy Constructor - Dynamic Constructors - Constructing Two Dimensional Arrays - Destructors.

Unit III

Inheritance: Introduction - Defining Derived Classes - Single Inheritance - Making a Private Member Inheritable - Multilevel Inheritance - Multiple Inheritance - Hierarchical Inheritance - Virtual Base classes - Abstract Classes - Constructors in Derived Classes - Member Classes: Nesting of Classes.

Pointers Virtual Functions and Polymorphism: Introduction - Pointers to Objects - this Pointer - Pointers to Derived Classes - Virtual Functions - Pure Virtual Functions. Managing Console I/O Operations - C++ Streams - C++ Stream Classes - Unformatted I/O Operations, Formatted Console I/O Operations - Managing Output with Manipulators.

Unit IV

Working with Files: Introduction - Classes for File Stream Operations - Opening and Closing a File - Detecting End of File - More About Open (): File Modes - File Pointers and their Manipulations - Sequential Input and output Operations - Updating a File - Random Access - Error handling During File Operations - Command Line Arguments.

Unit V

Templates: Introduction - Function Templates - Overloaded Function Templates - Nesting of Function Calls - Multiple Arguments Function Template - User Defined Templates.

Exception Handling: Introduction - Error Handling - Exception Handling Model - Exception handling Constructs - Handler Throwing the Same Exception Again - List of Exceptions - Catch All Exceptions - Exceptions in Constructors and Destructors - Handling Uncaught Exceptions - Ten Rules for Handling Exceptions Successfully.

Text Book:

1. E.Balagurusamy, Object Oriented Programming with C++, Tata McGraw Hill, New Delhi, Sixth Edition, 2013.

Books for Reference:

1. Object Oriented Program in C++ – Nabajyoti Barkakati, A prentice Hall of India Private Limited, New Delhi 1997.
2. Mastering C++ – K R Venugopal, T. Ravishankar, RajKumar, Tata Mc Graw-Hill Publishing Company Limited, New Delhi, 2006.



**I YEAR – II SEMESTER
COURSE CODE: 7BCA2P1**

CORE COURSE - IV – PROGRAMMING IN C++ LAB

(Use Object Oriented Programming Concept in Most of the Programs)

1. Write a program to find the simple and compound interest.
2. Write a program to check whether the given number is Armstrong or not.
3. Write a program to find factorial using recursion.
4. Write a program to find whether the given number is odd or even using class.
5. Write a program to count the object value using the storage keyword static.
6. Write a program to find the multiplication values and the cubic values using inline function.
7. Write a program to display the employee details with using array of object.
8. Write a program to print student details using constructor and destructor.
9. Write a program to find the mean value of a given number using friend function.
10. Write a program to find out the payroll system using single inheritance.
11. Write a program to find out the student details using multiple inheritances.
12. Write a program to calculate the area of circle, rectangle and triangle using function overloading.
13. Write a program to print student details with using virtual function.
14. Write a program to perform the write operation within a file.
15. Write a program to read the content of a file.
16. Write a program to perform the file stream operation.
17. Write a program for command line arguments.
18. Write a program for to swap the numbers using the concept of function template.
19. Write a program to perform exception handling for Divide by zero Exception.
20. Write a program for try, catch, throw and throws.



**II YEAR – III SEMESTER
COURSE CODE: 7BCA3C1**

CORE COURSE - V – 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 – Silberschatz Korth Sudarshan, International (6th Edition) McGraw Hill Higher Education, 2011.
2. Jose A.Ramalho – Learn ORACLE 8i BPB Publications 2007

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, McGraw Hill, Third Edition, 2003.
3. “Oracle 9i PL/SQL Programming “Scott Urman, Oracle Press, Tata McGraw Hill, 2002.



**II YEAR – III SEMESTER
COURSE CODE: 7BCA3P1**

CORE COURSE - VI – ORACLE LAB

1. Creating, modifying and dropping Tables.
2. Creating tables with referential and check constraints.
3. Inserting, modifying, deleting rows.
4. Dropping, disabling /enabling constraints.
5. Retrieving rows with operators in where Clause.
6. Retrieving rows with Character functions.
7. Retrieving rows with Number and Date functions.
8. Retrieving rows with Group functions and HAVING.
9. Joining Tables. (Inner and Outer).
10. Retrieving rows with Sub Queries.
11. Simple PL/SQL Programs.
12. PL/SQL programs with control structures.
13. PL/SQL programs with Cursors.
14. PL/SQL programs with Exception Handling.
15. Creating and Calling Procedures.
16. Creating and Calling Functions.
17. Creating and Calling Packages.
18. Overloading Packages.
19. Working with Triggers.



**II YEAR – IV SEMESTER
COURSE CODE: 7BCA4C1**

CORE COURSE - VII – JAVA PROGRAMMING

Unit I

Fundamentals of Object Oriented Programming: Introduction – Object Oriented Paradigm – Basic Concepts of OOP – Benefits of OOP – Applications of OOP.

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.

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”, Third Edition 2010”, E. Balagurusamy, TATA McGraw-Hill Publishing Company Limited, New Delhi

UNIT I	Chapters	: 1,2,3,4
UNIT II	Chapters	: 5, 6, 7
UNIT III	Chapters	: 8,9,10
UNIT IV	Chapters	: 11, 12, 13
UNIT V	Chapters	: 14, 15

Books for Reference:

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.



**II YEAR – IV SEMESTER
COURSE CODE: 7BCA4P1**

CORE COURSE - VIII – JAVA PROGRAMMING LAB

1. Write a program to sort the given numbers.
2. Write a program to reverse the given number.
3. Write a program for convert double to long using type casting.
4. Write a program to perform arithmetic operation.
5. Write a program Java program to find out square root of a given number using mathematical function.
6. Write a program to implement stack operation using arrays.
7. Write a program to implement queue operation using arrays.
8. Write a program to calculate area of Square and Rectangle using Method Overloading.
9. Write a program to perform the String operations. (Reverse, Copy, Concatenate, Compare).
10. Write a program to display student mark details using single Inheritance.
11. Write a program on implementation of multiple inheritance using interfaces to calculate the area of a rectangle and triangle.
12. Write a program to implement package.
13. Write a program to implement thread priorities.
14. Write a program to implementing the “Runnable “Interface.
15. Write a program to implement exception handling [try, catch, throw, throws and finally].

Applet

16. Write a program to draw House.
17. Write a program to draw our National Flag.
18. Write a program to Draw Bar Charts.
19. Write a program to accept two numbers in Text Field. Add the two numbers.



**III YEAR – V SEMESTER
COURSE CODE: 7BCA5C1**

CORE COURSE - IX – .NET PROGRAMMING

Unit I – INTRODUCTION

Overview of Microsoft .NET Framework - The .NET Framework components-The Common Language Runtime (CLR) Environment- The .NET Framework class Library - Getting Started with Visual Basic .net IDE : Set up of work environment, start page, the menu system, toolbars, the new project dialog box, graphical designers, code designers, the object explorer, the toolbox, the solution explorer, the class view window, the properties window, the dynamic help window, the server explorer, the output window, the command window - Visual basic language concept : variables, Constants, Data Types, Operators, Control Structures and loops - Arrays : single and multidimensional array, declaring, dynamic array.

Unit II - INTRODUCTION TO WINDOWS COMMON CONTROLS

Working with Form - Properties : appearance, behaviour, layout, windows style etc, methods and events - Differentiate procedure oriented, object oriented and event driven programming – Input box- Message box- Working with Common Tool Box Controls: Label , button, Textbox , NumericUpDown , Check Box, Radio Button , Group Box , control and all important methods and events.

Unit III - ADDITIONAL CONTROLS AND MENUS OF WINDOWS

Working with other controls of toolbox: Date Time Picker, List Box, Combo box, Picture Box, Rich Text Box, Progress bar, Masked Text box, Link Label, Checked List box - Working with Menus: creating menu,inserting,deleting,assigning short cut keys, popup menu.

Unit IV - INBUILT FUNCTIONS AND DIALOG BOX

Inbuilt Functions : Mathematical Functions-String manipulation - Dialog Boxes: OpenFileDialog, SaveFileDialog, FontDialog, ColorDialog, PrintDialog - Sub Procedures and functions : declaring, passing and returning arguments, exiting from it, pass by value and pass by ref - Exception Handling : Structured Error Handling (TryCatchfinally), Unstructured Error Handling (On error go to line, goto 0, goto -1, resume next) - Multiple document interface (MDI) : MDI Parent form and child form.

Unit V – DATABASE ACCESS USING ADO.NET

ADO .NET Object Model: Dataprovider - Dataset - ADO .NET Programming : Creating a Database Application, Creating Connection to a Database using ADO.NET , Populating Data in ADO.NET, Browsing Records, Datagrid view, Editing, Saving, Adding and Deleting Records using bounded and unbounded.

Text Books:

1. Shelly, cashman, Quasney ‘ Microsoft Visual Basic .NET : Comprehensive Concepts And Techniques ‘Cengage learning, 2012
2. StevenHolzner , Visual Basic .NET Programming Black Book , Dreamtech Press Publications, New Delhi

Book for Reference:

1. Julia Case Bradley and Anita C Millspaugh Programming in Visual Basic.NET McGraw Hill Higher Education (September 2002)



**III YEAR – V SEMESTER
COURSE CODE: 7BCA5P1**

CORE COURSE - X–● NET PROGRAMMING LAB

1. Observe and draw visual .net IDE layout and hands on practice to create, save and open the project.
2. Write a program to accept any character from keyboard and display whether it is vowel or not.
3. Write, test and debug program to test inputbox, messagebox.
4. Write, test and debug applications to use textbox, label, and button.
5. Write, test and debug applications to use radio button, checkbox, numericupdown and group box controls.
6. Write, test and debug application using date time picker, list box, combo box, picture box.
7. Write, test and debug application using rich text box, progress bar, masked text box, link label.
8. Write, test and debug application using checked list box, scroll bars, timer.
9. Write, test and debug applications using menu.
10. Write, test and debug applications using dialog boxes.
11. Write, test and debug applications using sub procedures and functions.
12. Write, test and debug applications using MDI.
13. Write, test and debug applications using math and string manipulation functions.
14. Create and test connection using ado.net to view SQL express server/Microsoft Access/ Oracle/other database data in textbox etc controls.
15. Create connection view controls like data-gridview controls.
16. Write, test and debug small application to add, edit, search, and delete record in database in bounded mode.
17. Write, test and debug small application to add, edit, search, and delete record in database in unbounded mode i.e. through coding.



**III YEAR – V SEMESTER
COURSE CODE: 7BCA5C2**

CORE COURSE - XI – COMPUTER SYSTEM ARCHITECTURE

Unit I

Data Representation: Data types, Complements, Register Transfer Language, Register Transfer Bus and Memory Transfers, Arithmetic, Logic and Shift unit. Introduction to Basic computer organization and design: Instruction codes, computer registers, Computer Instructions, Timing and control, Instruction cycle.

Unit II

Memory reference instructions Input – Output and Interrupt. Introduction to programming the basic computer: Machine Language, Assembly Language, The assembler, Program Loops, Programming Arithmetic and Logic operations and Subroutines.

Unit III

Central Processing Unit: Introduction, General register Organization, Stack Organization, Instruction formats, addressing modes, data transfer and Manipulation, and Reduced Instruction Set Computer (RISC).

Unit IV

Introduction to computer Arithmetic, Addition and Subtraction, Multiplication algorithms, Division Algorithms, Input – Output Interface, priority Interrupt – Direct Memory Access, Input-Output Processor.

Unit V

Memory Organization: Memory Hierarchy, Main memory, Auxiliary memory, Associative memory, Cache memory, Virtual memory. Characteristics of multiprocessors.

Text Book:

1. Computer System Architecture, M.Morris Mano, PHI Pvt. Ltd. Third Edition, 2013.

Book for Reference:

1. Modern Computer Architecture, Mohammed Rafiquzzaman, and Rajan Chandra, Galgotia Publications Pvt. Ltd.



**III YEAR – V SEMESTER
COURSE CODE: 7BCAE1A**

ELECTIVE COURSE - I (A) – 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

Java script: Introduction to Scripting: Introduction – Memory Concepts – Arithmetic – Decision Making – Java Script Internet & www resources. Java script Arrays: Passing arrays to Functions – Multi Subscripted Array.

Unit III

Java Script Control Structures – Selection Structure: If – If Else, Repetition Structure: While – For – Do While – Logical operators.
Java Script Functions: Introduction – Program Modules in Java Script Programmer Defined Functions.

Unit IV

Function Definition: Duration of identifiers – scope rules – recursion – java script global functions Java Script Objects: Introduction – Thinking about objects – Math, Strings, Date, Boolean and Number Objects.

Unit V

VB Script: Introduction- Operators – Data Type and Control Structures – VB Script Functions – Array – String Manipulation – Classes and Objects – Operator Precedence Chart-The MsgBox functions – input boxes – controlling the flow of code -Simple Program .

Text Book:

1. Web Technology – A Developer’s Perspective, N.P. Gopalan, J. Akilandeswari, Prentice Hall India Learning Private Limited, New Delhi, 2007.

Books for Reference:

1. Internet and World Wide Web - How to Program H.M.Deitel, P.J.Deital, T.R.Neito, Pearson Education Asia-Addison Wesley Longman pvt Ltd.
2. Web Technologies - Godbole A. S. & Kahate A., TMH.
3. Web Technology & Design - Xavier C., New Age Publication



**III YEAR – V SEMESTER
COURSE CODE: 7BCAE1B**

ELECTIVE COURSE - I (B) – DESIGN AND ANALYSIS OF ALGORITHM

Unit I

Algorithms – Conventions – writing structured programs – Analyzing algorithms – Sorting: Heap sort – Binary Search- Finding the Maximum and Minimum – Merge Sort – Quick Sort – Selection Sort.

Unit II

Greedy Method: The General Method – Optional Storage on Tapes – Knap Sack Problems – Job Sequencing with Deadlines – Optional Merge Patterns – Minimum Spanning Trees – Single Source Shortest Paths.

Unit III

Dynamic Programming: The General Method – Multistage Graphs – All pair’s shortest Paths – Optional Binary Search Trees – 0/1 Knapsack – Reliability Design the Traveling Salesman Problem- Game Theory.

Unit IV

Backtracking: The General Method – The 8 Queens Problem – Sum Of Subsets – Graph Coloring – Hamiltonian Cycles – Knapsack Problem.

Unit V

Branch & Bound: The General Method – 0/1 Knapsack Problem – Traveling Salesperson – Efficiency Considerations.

Text Book:

1. Fundamentals of Computer Algorithms – Ellis Horowitz and Sartaj Sahni, Galgotia Publications, Second Edition 2008 (Chapters 1 to 5, 6.4,7 & 8).

Books for Reference:

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, “Introduction to Algorithms”, Third Edition, PHI Learning Private Limited, 2012.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, “Data Structures and Algorithms”, Pearson Education, Reprint 2006.



**III YEAR – V SEMESTER
COURSE CODE: 7BCAE2A**

ELECTIVE COURSE - II (A) – COMPUTER GRAPHICS

Unit I

Introduction: Overview – Brief History – Applications of Computer Graphics – Video Display Generation – Input Devices – Hard Copy output Devices – Graphics System Software– Output Primitives: Point Plotting – Line Draw Algorithms – Using Equation of a line – DDA – Bresenham’s algorithm – Circle Generation Algorithms – Drawing Ellipse

Unit II

Two Dimensional Transformations: Transformation Principles – Basic Transformations – Matrix Representation – Composite Transformations.

Unit III

Two dimensional viewing and Clipping: Viewing Transformations – Windows and viewpoints – Aspect Ratio – Clipping and Shielding: Point Clipping – Line Segment Clipping– Convex polygon clipping – Sitherland Hodgman Algorithm.

Unit IV

Three Dimensional Transformations: Concepts – Basic Transformations: Translation, Scaling, Rotation and Mirror Reflection – Matrix Representation – Composite Transformation.

Unit V

User Interface design: Components of User interface – The User’s model – The Command Language – Styles of Command Language – Information Display – Feedback – Examples.

Text Books:

1. M. Newman and F.Sproull, Interactive Computer Graphics, McGraw Hill.
2. Plastok and Gordon Kalley, Computer Graphics, McGraw Hill.
3. Computer Graphics Donald Hearn and M. Pauline Bake , Pearson Education

Book for Reference:

1. Foley Feiner, Computer Graphics, Principles and Practice – Addison Wesley.



**III YEAR – V SEMESTER
COURSE CODE: 7BCAE2B**

ELECTIVE COURSE - II (B) - OPERATING SYSTEM

Unit I

Introduction: Views- Goals - Types of System- OS Structure - Components - Services - System Structure - Layered Approach - Virtual Machines - System Design and Implementation. Process Management: Process - Process Scheduling - Cooperating Process - Treads - Inter-process Communication. CPU Scheduling: CPU Schedulers - Scheduling Criteria - Scheduling Algorithms.

Unit II

Processor Management: Process Synchronization: Critical-Section Problem - Synchronization Hardware - Semaphores Classical Problems of Synchronization - Critical Region - Monitors. Deadlocks: Characterization- Methods for Handling Deadlocks - Deadlock Prevention - Avoidance - Detection - Recovery.

Unit III

Memory Management: Address Binding - Dynamic Loading and Linking - Overlays - Logical and Physical Address Space - Contiguous Allocation - Internal & External Fragmentation. Non-Contiguous Allocation: Paging and Segmentation Schemes - Implementation - Hardware-Protection - Sharing - Fragmentation.

Unit IV

Virtual Memory: Demand Paging - Page Replacement - Page Replacement Algorithms - Thrashing.

File System: File Concepts - Access Methods - Directory Structures - Protection Consistency Semantics - File System Structures - Allocation Methods - Free Space Management.

Unit V

I/O System: Overview - I/O Hardware - Application I/O Interface - Kernel I/O Subsystem - Transforming I/O Requests to Hardware Operations - Performance. Secondary Storage Structures: Protection - Goals - Domain - Access matrix - The Security Problem - Authentication - Threats - Threat Monitoring - Encryption.

Text Book:

1. Silberschatz P.B.Galvin, Gange., 'Operating System Concepts', 9th Edition , john wiley and sons Inc, 2012

Books for Reference:

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



**III YEAR – VI SEMESTER
COURSE CODE: 7BCA6C1**

CORE COURSE - XII – DATA MINING AND WAREHOUSING

Unit – I

Introduction: Data mining application – data mining techniques – data mining case studies- the future of data mining – data mining software - **Association rules mining: Introduction-** basics- task and a naïve algorithm- apriori algorithm – improve the efficient of the apriori algorithm – mining frequent pattern without candidate generation (FP-growth) – performance evaluation of algorithms.

Unit – II

Classification : Introduction – decision tree – over fitting and pruning - DT rules-- naïve bayes method- estimation predictive accuracy of classification methods - other evaluation criteria for classification method – classification software

Unit – III

Cluster analysis: cluster analysis – types of data – computing distances-types of cluster analysis methods - partitioned methods – hierarchical methods – density based methods – dealing with large databases – quality and validity of cluster analysis methods - cluster analysis software.

Unit – IV

Web data mining: Introduction- web terminology and characteristics- locality and hierarchy in the web- web content mining-web usage mining- web structure mining – web mining software - **Search engines:** Search engines functionality- search engines architecture – ranking of web pages.

Unit – V

Data Warehousing: Introduction – Operational data sources- data warehousing - Data warehousing design – Guidelines for data warehousing implementation - Data warehousing metadata - **Online analytical processing (OLAP):** Introduction – OLAP characteristics of OLAP system – Multidimensional view and data cube - Data cube implementation - Data cube operations OLAP implementation guidelines

Text Book:

1. Introduction to Data mining with case studies, G.K. Gupta, 2nd Edition, PHI , 2011

Books for Reference:

1. Arun K.Pujari, Data Mining Techniques, Universities Press (India) Limited, 2011.
2. George M. Marakas, Modern Data warehousing, Mining and Visualization: Core Concepts, Printice Hall, First Edition, 2011



**III YEAR – VI SEMESTER
COURSE CODE: 7BCA6C2**

CORE COURSE - XIII – COMPUTER NETWORKS

Unit I

Introduction: Uses of Computer Networks – Network Hardware and network software –Reference models – Example Networks – Network Standardization – Physical Layer: Transmission Media – Telephone System – ISDN – Broadband and Narrowband ISDN – ISDN and ATM – Communication Satellites.

Unit II

Data Link Layer: Design Issues – Error Detection and correction codes – Elementary data link Protocols – Sliding Window Protocols – Protocol Specification and Verification: Finite state models – Petri net models – Example Drink Protocols: HDLC – SLIP – PPP – Media access Sub layer: Multiple access protocols – ALOHA – Carrier Sense multiple Access protocols – Collision free Protocols.

Unit III

Network Layer: Design Issues – Routing Algorithms – Congestion Control Algorithms – Internetworking: Tunneling – Fragmentation – Firewalls – Network Layer in the internet – IP– Subnets – Internet control Protocols: Address Resolution Protocol – ICMP – RARP – Internet multicasting – Network layer in ATM networks: Cell Format – Connection setup – Routing and switching – Services Categories – ATM LANs.

Unit IV

Transport Layer: Transport Service – Elements of Transport Protocols: Addressing – Floe Control and Buffering – Multiplexing – Crash Recovery – Performance issues – Measuring Network performance – Internet Transport Protocols – TCP – UDP – Protocols for Gigabit Networks.

Unit V

Application Layer: Network Security – Cryptography – Secret and Public Key Algorithms – DNS – SNMP – Electronic Mail – Electronic Mail Privacy – World Wide Web: Client Side –Server Side – Multimedia – Audio – Video – Data compression – JPEG, MPEG Standards.

Text Book:

1. Andrew S.Tenenbaum, Computer Networks, Prentice Hall of India, Fifth Edition , 2010.

Books for Reference:

1. Uless Black, Computer Networks, PHIE.
2. Data and computer communications, PHI, W.Stallings
3. Data Communication and networking by Behrouz A.Forouzen, Tata McGraw Hill Edition.



**III YEAR – VI SEMESTER
COURSE CODE: 7BCA6C3**

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 – detailed design considerations – realtime and distributed system design – test plan – milestones, walkthroughs and inspections – design guidelines

Software Implementation: Structured coding techniques – coding style – standards and guidelines

Unit IV

Software Testing: A Strategic approach to software testing – strategic issues – unit testing – integration testing – validation testing – system testing – the art of debugging

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

Unit V

Software Quality Assurance: Quality concepts – software quality assurance – software reviews – formal technical reviews – statistical quality assurance – the SQA plan – the ISO 9000 quality standards

Text Book:

1. Software Engineering Concepts–Richard E.Fairley, Tata McGraw Hill Publishing Company Ltd,New Delhi,2006(Chapters:1, 2, 3.1, 3.2, 3.4, 4.1, 4.2, 5, 6.1, 6.2, 6.3,9)

Books for Reference:

1. Software Engineering – A Practitioner’s approach – Roger S. Pressman, (Fourth Edition) McGraw Hill International Editions (Chapters: 8.1, 8.3, 8.4, 8.5, 8.7, 8.9, 8.10, 17)
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: 7BCA6PR**

CORE COURSE - XV – PROJECT

A maximum of two students can combine and do a project in the subject related to Computer Applications with the guidance of a teacher who will be the internal guide. The project has to be submitted to the respective department and evaluated by the internal and external examiner and the marks sent to the university.



**III YEAR – VI SEMESTER
COURSE CODE: 7BCAE3A**

ELECTIVE COURSE - III (A) – OPEN SOURCE LAB

1. Kernel configuration, compilation and installation.
2. Install various software on Linux.
3. Install and configure XAMP.
4. Create a MYSQL database and table.
5. Write a MYSQL statement to insert a record into the table.
6. Write a MYSQL statement to update the values.
7. Write a PHP program to perform the arithmetic operation.
8. Write a PHP program Adding numbers using function.
9. Write a PHP program to generate 10 Random Numbers Using Loop.
10. Write a perl program to check whether the given no is ODD or EVEN.
11. Write a perl program to check whether a number is palindrome or not.
12. Write a python program to find the largest among three numbers.
13. Write a python program to find sum of digits of a number.
14. Write a python program to find the reverse number.
15. Connect to a MYSQL database with php, perl and python.



**III YEAR – VI SEMESTER
COURSE CODE: 7BCAE3B**

**ELECTIVE COURSE - III (B) – PC ASSEMBLING, TROUBLESHOOTING AND
SYSTEM MANAGEMENT LAB**

PC Assembling

1. Installing the motherboard.
2. Installing the CPU and heat sink.
3. Installing the RAM.
4. Installing the power supply.
5. Installing the hard disk and optical drive.
6. Connecting various cables (ATX power connector, cabinet cables for power, reset button, front USB/audio panel cable).
7. BIOS settings – setting time, changing boot sequence, system password setting
8. Changing CMOS battery
9. Connecting extra cabinet fan

PC Troubleshooting

1. Booting with CD/DVD, pen drive, LAN & hard disk with different OS
2. Formatting hard drive.
3. Installing the OS and drivers.
4. Troubleshooting BSOD (blue screen of death)
5. Installation of service packs, applications such as MS Office, Anti-virus software.
6. Creating restore point and backup a drive.
7. Using hard disk tools (sfc, disk checker, defragmenter, data recovery).
8. Windows update, registry fix, msconfig, gpedit.
9. Using repair tools like ccleaner, system mechanic, malware bytes.

System Management

1. Familiarization with configuring and installing a LAN (Assign IP addresses)
2. Internet connection sharing over LAN
3. File transfer over LAN
4. Installing and using web browser and firewall
5. Using search engines like Google
6. CD/DVD burning – image burning – data/audio/video CD/DVD making with Nero
7. Playing audio and video with VLC media player – creating play list

