COURSE OUTCOMES

I BCA

Semester I

PROGRAMMING IN C **SUBJECT CODE: U2CAC1**

In this course, the students will

CO1:	Illustrate the flowchart and design an algorithm for a given problem and to develop C programs using operators
CO2:	Develop conditional and iterative statements to write C programs
CO3:	Exercise user defined functions to solve real time problems
CO4:	Inscribe C programs that use Pointers to access arrays, strings and functions.
CO5:	Exercise user defined data types including structures and unions to solve problems
CO6:	Exercise files concept to show input and output of files in C

DISCRETE MATHEMATICS **SUBJECT CODE: U2MAA1**

In this course, the students will

CO1:	Understand the theory of sets, relations and functions.
CO2:	Use the tool of mathematical induction.
CO3:	Acquire the knowledge of logics.
CO4:	Solve the recurrence relation.
CO5:	Gain the knowledge on basic concepts of graph theory.

LAB: PROGRAMMING IN C **SUBJECT CODE: U2CAC1P**

In this course, the students will

CO1:	Illustrate flowchart and algorithm to the given problem
CO2:	Understand basic Structure of the C-PROGRAMMING, declaration and usage of variables
CO3:	Write C programs using operators
CO4:	Exercise conditional and iterative statements to Write C programs
CO5:	Write C programs using Pointers to access arrays, strings and functions.
CO6:	Have deep knowledge in this language which helps the students in becoming an Embedded C and Internet of Things (IOT) Programmer

OFFICE AUTOMATION LAB **SUBJECT CODE: U2CAS1P**

In this course, the students will

CO1:	Generate documentation, table and letter.
CO2:	Understand Newspaper editing and mail merge options.
CO3:	Know how to convert input data into spreadsheet.
CO4:	Perform calculations using both manually inputting formulas and Built in functions.
CO5:	Generate simple and effective graphs to describe data.
CO6:	Use design layouts and templates for presentations.
CO7:	Create slide presentations that include text, graphics, animation, and transitions.
CO8:	Design a simple database
CO9:	Be able to query a database.
CO10:	Design a FORM and generate a REPORT.

Semester II

Object Oriented Programming with C++ **SUBJECT CODE: U2CAC2**

In this course, the students will

CO1:	Learn syntax, features of and how to utilize the Standard Template Library.
CO2:	Perform object oriented programming to develop solutions to problems demonstrating usage of control structures, modularity, I/O. and other standard language constructs.
CO3:	Demonstrate adeptness of object oriented programming in developing solutions to problems demonstrating usage of data abstraction, encapsulation, and inheritance.
CO4:	Demonstrate ability to implement Runtime Polymorphism using Pointers and Virtual Functions.
CO5:	Learn other features of the C++ language including templates, exceptions, forms of casting, conversions, covering all features of the language.

OPERATIONS RESEARCH **SUBJECT CODE: U2MAA2**

In this course, the students will

CO1:	Understand origin & development of OR.
CO2:	Understand application of OR.
CO3:	Develop the skills in solving LPP using various methods.
CO4:	Understand the concept of travelling salesman problem and solve it by assignment method.

Object Oriented Programming with C++ Lab SUBJECT CODE: U2CAC2P

In this course, the students will

CO1:	Be Capable to develop sample programs in C++ using standard language constructs.
CO2:	Develop programs using Classes and Objects.
CO3:	Develop programs using OOPS Concepts such as Inheritance and Polymorphism.
CO4:	Perform Manipulations over on strings in C++.
CO5:	Develop programs using templates and exceptions handling in C++.

DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION

SUBJECT CODE: U2CAS2

In this course, the students will

CO1:	Be familiar with basic logic gates -- AND, OR & NOT, XOR, XNOR; independently or work in team to build simple logic circuits using basic.
CO2:	Understand Boolean algebra and basic properties of Boolean algebra; able to simplify simple Boolean functions by using the basic Boolean properties.
CO3:	Understand and examine the structure of various number systems.
CO4:	Understand, analyze and design various combinational and sequential circuits.
CO5:	Understand the relationship between instruction set architecture, system architecture, addressing modes, program sequencing, memory operations.
CO6:	Understand the usage of interrupts to implement I/O control and data transfers.
CO7:	Acquire knowledge of Semiconductor RAM and ROM memories, Cache memories and Virtual memories and their hierarchy.

II BCA

Semester III

JAVA PROGRAMMING SUBJECT CODE: U2CAC31

In this course, the students will

CO1:	Know the principles of object oriented programming concepts and solve simple problems using the fundamental syntax and semantics of the java programming language
CO2:	Understand the behavior of primitive data types, operators and decision& iteration control structures.
CO3:	Have the ability to use class and its types, constructor, overloading,

	overriding and arrays in a Java program.
CO4:	Understand the concept of package, interface, multithreading, and exception handling.
CO5:	Know file concept for input and/or output
CO6:	Acquire the knowledge about applet class and creating the applet animation programs.

DATA STRUCTURES **SUBJECT CODE: U1CAC32**

In this course, the students will

CO1:	Analyze algorithms and algorithm correctness.
CO2:	Know to write well-structured procedure-oriented programs.
CO3:	Know how to implement the Stack, Queue ADT using both array based and linked-list based data structures.
CO4:	Analyze run-time execution of sorting methods, including selection, merge sort, heap sort and Quick sort.
CO5:	Know how to implement binary search trees and graphs.

COMPUTER GRAPHICS **SUBJECT CODE: U2CAC33**

In this course, the students will

CO1:	Get the concepts of Graphics display devices, different types of graphics drawing algorithms.
CO2:	Understand the theory of transformations such as scaling, rotation, translation, reflection, shearing etc.
CO3:	Demonstrate ability to implement clipping operations on simple 2-dimensional and 3-dimensional objects.
CO4:	Able to understanding of the theory of projection and Viewing.
CO5:	Understand animation techniques

COMPUTER BASED FINANCIAL ACCOUNTING **SUBJECT CODE: U2CCA3A**

In this course, the students will

CO1:	Provide knowledge regarding basic concept of accounting, Accounting principles and Accounting rules.
CO2:	Get Knowledge regarding types of accounts, preparation of journal, Ledger and

	Trial Balance
CO3:	Inculcate skill in preparing final accounts.
CO4:	Know the fundamentals of Tally, ledger creation and features.
CO5:	Concentrate on creating vouchers and reports.

LAB: JAVA PROGRAMMING **SUBJECT CODE: U2CAC3P1**

In this course, the students will

CO1:	Write, compile, and execute Java programs that may include basic data types and control flow constructs.
CO2:	Write, compile and execute Java programs using object oriented class structures with parameters, constructors, and utility and calculations methods, including inheritance, test classes and exception handling.
CO3:	Write, compile, and execute Java programs using arrays and recursion.
CO4:	Write, compile, and execute Java programs manipulating Strings and text documents.
CO5:	Write, compile, and execute Java programs that include GUIs and event driven programming.

LAB: DATA STRUCTURES **SUBJECT CODE: U3CAS3P**

In this course, the students will

CO1:	Able to choose appropriate data structure as applied to specified problem definition.
CO2:	Able to handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
CO3:	Able to use linear and non-linear data structures like stacks, queues , linked list etc.
CO4:	Analyze run-time execution of sorting methods, including selection, merge sort, heap sort and Quick sort.
CO5:	Able to apply concepts learned in various domains like DBMS, compiler construction etc.
CO6:	Have practical knowledge on the applications of data structures

Semester IV

OPERATING SYSTEMS **SUBJECT CODE: U2CAC41**

In this course, the students will

CO1:	Understand the functions, structures and history of Operating Systems.
CO2:	Understand design issues associated with Operating Systems.
CO3:	Understand the concept of process and scheduling algorithms.
CO4:	Understand the concept of deadlock and different ways to handle it.
CO5:	Understand the concept of various memory management techniques.
CO6:	Understand the issues related to file system interface and Implementation, Disk Management.

DATA COMMUNICATION AND NETWORKS **SUBJECT CODE: U2CAC42**

In this course, the students will

CO1:	Acquire knowledge about the basic communication / networking terms and OSI model.
CO2:	Understand the use of transmission media, working of interfaces and different error detection and correction techniques.
CO3:	Acquire knowledge about the networking devices and network protocols.
CO4:	Understand the working principle of various switching techniques.
CO5:	Acquire knowledge of networking and internetworking devices, routing algorithms and overall understanding of the WWW.
CO6:	Acquire knowledge about the emerging network technologies.
CO7:	Have a deep knowledge in this subject which helps them in becoming a Network Administrator.

ADVANCED JAVA PROGRAMMING **SUBJECT CODE: U2CAC43**

In this course, the students will

CO1:	Understand the GUI components to create user interface.
CO2:	Understand the basic concepts in TCP/IP and UDP socket programming.
CO3:	Understand the basic concepts in Java Swing.
CO5:	Acquire knowledge about the manipulation of database using SQL with JDBC.
CO6:	Understand the basic concepts in JSP Programming.

PRINCIPLES OF COSTING **SUBJECT CODE: U2CCA4A**

In this course, the students will

CO1:	know the basic concepts of costing
CO2:	learn Cost Sheet
CO3:	study Material cost and Labour Cost
CO4:	learn Marginal Costing

LAB: VISUAL BASIC PROGRAMMING **SUBJECT CODE: U3CAS4P**

In this course, the students will

CO1:	Understand the fundamentals of visual programming and Graphical User Interface.
CO2:	Understand the properties and usage of various controls.
CO3:	Acquire knowledge about developing windows applications.
CO4:	Create DLL files.
CO5:	Perform Client/Server programming.
CO6:	Develop real world projects.
CO7:	Work in advanced visual programming languages.

LAB: ADVANCED JAVA PROGRAMMING **SUBJECT CODE:U3CAC4P1 / U2CAC4P2**

In this course, the students will

CO1:	Develop simple graphical user interface for java programs using GUI components
CO2:	Develop client/server applications and TCP/IP and UDP socket programming.
CO3:	Develop swing based graphical user interfaces.
CO4:	Analyze how Servlets fit into the java based web application and develop server side programs.
CO5:	Develop distributed applications using RMI
CO6:	Create dynamic web applications using JSP

VIRUDHUNAGAR HINDU NADARS' SENTHIKUMARA NADAR COLLEGE
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[Re-accredited with 'A' Grade by NAAC]
Virudhunagar – 626 001.

III BCA

Semester V

RELATIONAL DATABASE MANAGEMENT SYSTEMS

SUBJECT CODE: U2CAC51

In this course, the students will

CO1:	Understand the basic concepts and the applications of database systems.
CO2:	Define a problem at the view level and ability to understand thephysical structure of the database to handle data.
CO3:	Utilize the knowledge of basics of SQL and construct queries using SQL.
CO4:	Normalize the database and understand the internal data structure.
CO5:	Apply Relational Database theory and be able to write Relational Algebra expressions for queries.
CO6:	Use design principles for logical design of database using E-R method.
CO7:	Understand the transaction systems and Concurrency Control.
CO8:	Design and implement a database schema for a given problem domain.
CO9:	Prepare forms and reports.
CO10:	Perform Application development using SQL as a Back end tools.

RELATIONAL DATABASE MANAGEMENT SYSTEMS LAB

SUBJECT CODE: U2CAC5P1

In this course, the students will

CO1:	Understand, appreciate and effectively explain the underlying concepts of database technologies
CO2:	Design and implement a database schema for a given problem-domain
CO3:	Populate and query a database using SQL DML/DDL commands.
CO4:	Normalize the database and understand the internal data structure.
CO5:	Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS
CO6:	Programming PL/SQL including stored procedures, stored functions, cursors, packages.

LAB: WEB TECHNOLOGY **SUBJECT CODE: U2CAC5P2**

In this course, the students will

CO1:	Design a basic web site using HTML5 and CSS3 to demonstrate responsive web Design.
CO2:	Retrieve, insert, update and delete data from the relational database MySQL.
CO3:	Create PHP resource pages and include them into another page.
CO4:	Develop simple web application using server side PHP programming and Database Connectivity using MySQL.
CO5:	Have a Good grounding of Web Application Terminologies and other web services.
CO6:	Gain confidence to create dynamic website on real world problems.
CO7:	Use fundamental skills to maintain web server services required to host a website.

WEB TECHNOLOGY **SUBJECT CODE: U2CAE51**

In this course, the students will

CO1:	Acquire knowledge and Skills for creation of Web Site considering both Client- and server-side Programming.
CO2:	Create Web application using tools and techniques used in industry.
CO3:	Select and apply mark-up languages for processing, identifying, and presenting of information in web pages.
CO4:	Combine multiple web technologies to create advanced web components.
CO5:	To be familiarized with open source Frameworks for web development.

DATA MINING **SUBJECT CODE: U2CAE52**

In this course, the students will

CO1:	Understand the difference between Data Warehousing and general databases
CO2:	Determine the different steps followed in Data mining and pre-processing for Data mining
CO3:	Familiar with a data mining software system and use it for solving data mining problems
CO4:	Describe and apply at least one of the algorithms used for Association rules in data mining
CO5:	Describe tree-based approaches for classification
CO6:	Describe the Clustering basics and approaches

TCP / 1P **SUBJECT CODE: U2CAE53**

In this course, the students will

CO1:	Understand the various standards on data communication
CO2:	Understand the functionality of reference model for data communication
CO3:	Understand the various layers of different protocols
CO4:	Understand the basic concept of socket programming and client server model
CO5:	Ability to understand the concept of client server technology and remote login protocols
CO6:	Learn Multicasting protocols, SNMP, SMTP and TCP/IP on Embedded Systems and IPV6.

EMBEDDED SYSTEMS **SUBJECT CODE: U2CAE54**

In this course, the students will

CO1:	Describe the differences between the general computing system and the embedded system, also recognize the classification of embedded systems.
CO2:	Become aware of the architecture of the ATOM processor and its programming aspects (assembly Level)
CO3:	Become aware of interrupts, hyper threading and software optimization.
CO4:	Design real time embedded systems using the concepts of RTOS.
CO5:	Analyze various examples of embedded systems based on ATOM processor.

COMPUTER ALGORITHMS **SUBJECT CODE: U2CAE55**

In this course, the students will

CO1:	Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it.
CO2:	Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it.
CO3:	Describe the greedy paradigm and explain when an algorithmic design situation calls for it.
CO4:	Synthesize new graph algorithms and algorithms that employ graph computations as key components, and analyze them.
CO5:	Analyze worst-case running times of algorithms using asymptotic analysis.

CLOUD COMPUTING **SUBJECT CODE: U2CAE56**

In this course, the students will

CO1:	Know the client server architecture used in cloud
CO2:	Acquire knowledge about the services of cloud computing
CO3:	Gain knowledge about the service providers of the cloud
CO4:	Know how to protect our data in cloud
CO5:	Know the usage off cloud in mobile cloud computing
CO6:	Become data analysts and data scientists with statistical knowledge

FUNDAMENTALS OF INFORMATION TECHNOLOGY

SUBJECT CODE: U2CAN51

In this course, the students will

CO1:	Understand basic concepts and terminology of information technology.
CO2:	Have a basic understanding of personal computers and their operations.
CO3:	Be able to identify issues related to information security.
CO4:	Identify and resolve technical problems using trouble-shooting and research techniques.
CO5:	Analyze and select application and operating system settings to create an optimal user environment.

UNIX AND SHELL PROGRAMMING **SUBJECT CODE: U1CASL51**

In this course, the students will

CO1:	Discuss the architecture, networking and basic commands of UNIX
CO2:	Implement various file processing commands used in UNIX.
CO3:	Apply Regular expression to perform pattern matching using utilities like grep,sed and awk.
CO4:	Construct various shell scripts for simple applications.
CO5:	Explain the process management using system calls UNIX environment

SYSTEM SOFTWARE **SUBJECT CODE: U1CASL52**

In this course, the students will

CO1:	Able to identify and understand different phases and passes of compiler and their functioning.
CO2:	Able to understand the concept of syntax analysis and to solve the problems of predictive parsing
CO3:	Able to to differentiate between top down and bottom up parsing and understand syntax directed translation techniques
CO4:	Able to apply code optimization and code generation techniques.

Semester VI

SOFTWARE ENGINEERING **SUBJECT CODE: U2CAC61**

In this course, the students will

CO1:	Acquire strong fundamental knowledge in science, mathematics, fundamentals of computer science, software engineering and multidisciplinary engineering.
CO2:	Select and implement different software development process models and bring out innovative and novel solutions for software development
CO3:	Extract and analyze software requirements specifications for different projects and prepare documentations
CO4:	Define the basic concepts and understand the importance of Software project management concepts like cost estimation, scheduling and reviewing the progress.
CO5:	Develop some basic level of software architecture/design and apply standard coding practices
CO6:	Apply standard coding practices for the implementation of the software metrics
CO7:	Apply different testing and debugging techniques and analyzing their effectiveness.
CO8:	Demonstrate verification and validation techniques, QA that provide robust software and its maintenance.

DOT NET PROGRAMMING **SUBJECT CODE: U2CAC62**

In this course, the students will

CO1:	Know the architecture of dot net using CLR
CO2:	Implement C# knowledge in dot net framework
CO3:	Acquire the knowledge of ASP in dot net framework

CO4:	Design the webpage in ASP.NET
CO5:	Know the visual basic.net and design the form design for front end applications
CO6:	Connect the database with dataset of embedded database in dot net framework
CO7:	Understand the differences between the usage of C#, VB, J# with dot net

CRYPTOGRAPHY **SUBJECT CODE: U2CAC63**

In this course, the students will

CO1:	Understand, appreciate, employ, design and implement appropriate security technologies and policies to protect computers and digital information.
CO2:	Know Classical encryption techniques, Block ciphers and the Data Encryption Standard, Advanced Encryption Standard, Key management, Public key cryptosystems, Message authentication, Hash functions and algorithms, Digital signatures, E-Mail, Firewalls.
CO3:	Encrypt and decrypt messages using block ciphers, sign and verify messages using well known signature generation and verification algorithms.
CO4:	Identify computer and network security threats, classify the threats and develop a security model to prevent, detect and recover from the attacks.
CO5:	Develop SSL or Firewall based solutions against security threats, employ access control techniques to the existing computer platforms such as Unix and Windows.
CO6:	Acquire a high-level understanding of how information security functions in an organization.
CO7:	Be familiar with network security designs using available secure solutions (such as PGP, SSL, SET, etc)

PROJECT & VIVA – VOCE **SUBJECT CODE: U1CA6PV**

In this course, the students will

CO1:	Capable to acquire the generic software development skill through various stages of software life cycle.
CO2:	Able to ensure the quality of software through software development with various protocol based environment.
CO3:	Able to generate test cases for software testing.
CO4:	Able to handle software development models through rational methods.
CO5:	Get a confidence to develop a software project as individual.

LAB: DOT NET PROGRAMMING **SUBJECT CODE: U2CAC6P1**

In this course, the students will

CO1:	Able to create simple web applications and window applications.
CO2:	Develop web applications and learn advanced features of C#.
CO3:	Able to develop applications using C# elements and OOPS concepts
CO4:	Create basic web pages with appropriately used web controls.
CO5:	Understand the basic of the CSS standard and how it applies to web controls.
CO6:	Create a regular expression to match input to a specified pattern.
CO7:	Use ADO.NET in a web application to read, insert, and update data in a database.

LAB: MULTIMEDIA **SUBJECT CODE: U2CAC6P2**

In this course, the students will

CO1:	Design the photos using Editing Tools.
CO2:	Design and Implement an animation for various themes.
CO3:	Make various color corrections using adjustment layers for images.
CO4:	Implement Guide Motion tween and Shape tween.
CO5:	Prepare Multimedia Advertisement using Photoshop and Flash.

MOBILE APPLICATION DEVELOPMENT **SUBJECT CODE: U2CAS61**

In this course, the students will

CO1:	Get an introduction of Android, became familiar with Android SDK tools.
CO2:	Begin to develop an application framework that serves as primary teaching tool such as Splash screen followed by Main menu, settings, help and scores screen.
CO3:	Know how to collect input from the user, how to display dialogs for getting input from the user and also implement the core application logic of the game.
CO4:	Gain knowledge of more specialized features such as how to work with graphics and how to leverage Location Based Services to sample game application.
CO5:	Analyze different ways to test the mobile applications and find out the ways to prepare for publishing Android application to Android Market.

INTRODUCTION TO MULTIMEDIA **SUBJECT CODE: U2CAN61**

In this course, the students will

CO1:	Identify a range of concepts, techniques and tools for creating and editing the interactive multimedia applications.
CO2:	Identify the current and future issues related to multimedia technology.
CO3:	Identify both theoretical and practical aspects in designing multimedia systems surrounding the emergence of multimedia technologies using contemporary hardware and software technologies.
CO4:	Classify multimedia software based on its function
CO5:	Discuss about audio digitization, audio file format and audio software.

Course Outcomes –

MCA I MCA

Semester I

MATHEMATICAL FOUNDATIONS **SUBJECT CODE: P2CAC1M**

In this course, the students will

CO1:	Basic knowledge of matrix, set theory, functions and relations concepts needed for designing and solving problems.
CO2:	Logical operations and predicate calculus needed for computing skill
CO3:	Design and solve Boolean functions for defined problems.
CO4:	Apply the acquired knowledge of Compiler Design.
CO5:	Apply the acquired knowledge of finite automata theory and to design discrete problems to solve by computers.

DIGITAL LOGIC AND COMPUTER ORGANISATION

SUBJECT CODE: P2CAC11

In this course, the students will

CO1:	Explain the generic principles that underlie the design of digital computer, including data representation, digital logic and process simulation
CO2:	Describe the structure and functioning of a digital computer, including its overall system architecture, operating system, and digital components.
CO3:	Apply and Implement fundamental coding schemes.
CO4:	Understand the organization of the Control unit, Arithmetic and Logical unit,

	Memory unit and the I/O unit
CO5:	Understand the evolution of processors, their present technology and inter-process communication.

PROGRAMMING IN C **SUBJECT CODE: P2CAC12**

In this course, the students will

CO1:	Illustrate the flowchart and design an algorithm for a given problem and to develop C programs using operators
CO2:	Develop conditional and iterative statements to write C programs
CO3:	Exercise user defined functions to solve real time problems
CO4:	Inscribe C programs that use Pointers to access arrays, strings and functions.
CO5:	Exercise files concept to show input and output of files in C

MULTIMEDIA AND ITS APPLICATIONS **SUBJECT CODE: P2CAC13**

In this course, the students will

CO1:	Illustrate the flowchart and design an algorithm for a given problem and to develop C programs using operators
CO2:	Develop conditional and iterative statements to write C programs
CO3:	Exercise user defined functions to solve real time problems
CO4:	Inscribe C programs that use Pointers to access arrays, strings and functions.
CO5:	Exercise files concept to show input and output of files in C

LAB: PROGRAMMING IN C **SUBJECT CODE: P2CAC1P1**

In this course, the students will

CO1:	Understand basic Structure of the C-PROGRAMMING, declaration and usage of variables
CO2:	Write C programs using operators
CO3:	Exercise conditional and iterative statements to Write C programs
CO4:	Write C programs using Pointers to access arrays, strings and functions.
CO5:	Write C programs using pointers and allocate memory using dynamic memory management functions.

LAB: MULTIMEDIA **SUBJECT CODE: P2CAC1P2**

In this course, the students will

CO1:	Describe technical characteristics and performance of multimedia system and terminals
CO2:	Design creative approach in application of multimedia devices, equipment and systems
CO3:	Carry out experiments and measurements on the multimedia systems in laboratory conditions on real components and equipment
CO4:	Interpret and analyze measurement results obtained on the multimedia system and components
CO5:	Describe the development process and applications of the multimedia systems

Semester II

OPTIMIZATION TECHNIQUES **SUBJECT CODE: P1CAC2M**

In this course, the students will

CO1:	Define and use optimization terminology and concepts, and understand how to classify an optimization problem.
CO2:	Apply optimization methods to engineering problems, including developing a model, defining an optimization problem, applying optimization methods, exploring the solution, and interpreting results.
CO3:	Understand and apply unconstrained optimization theory for continuous problems.
CO4:	Understand and apply methods for computing derivatives.
CO5:	Understand and apply gradient-free and discrete optimization algorithms.

OBJECT ORIENTED PROGRAMMING WITH C++ **SUBJECT CODE: P2CAC21**

In this course, the students will

CO1:	Perform object oriented programming to develop solutions to problems demonstrating usage of control structures, modularity, I/O. and other standard language constructs.
CO2:	Demonstrate adeptness of object oriented programming in developing solutions to problems demonstrating usage of data abstraction, encapsulation, and inheritance.
CO3:	Demonstrate ability to implement one or more patterns involving realization of an abstract interface and utilization of polymorphism in the solution of problems which

	can take advantage of dynamic dispatching
CO4:	Learn syntax, features of, and how to utilize the Standard Template Library.
CO5:	Understand and apply Templates and Exception Handling in C++.

DATA STRUCTURE **SUBJECT CODE: P2CAC22**

In this course, the students will

CO1:	Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.
CO2:	Understand basic data structures such as arrays, linked lists, stacks and queues.
CO3:	Describe the hash function and concepts of collision and its resolution methods
CO4:	Solve problem involving graphs, trees and heaps
CO5:	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data

OPERATING SYSTEM **SUBJECT CODE: P2CAC23**

In this course, the students will

CO1:	Understand the basics of operating systems like kernel, shell, types and views of operating systems
CO2:	Describe the various CPU scheduling algorithms and remove deadlocks.
CO3:	Explain various memory management techniques and concept of thrashing
CO4:	Use disk management and disk scheduling algorithms for better utilization of external memory.
CO5:	Recognize file system interface, protection and security mechanisms.
CO6:	Explain the various features of distributed OS like Unix, Linux, windows etc.

LAB: DATA STRUCTURE **SUBJECT CODE: P2CAC2P1**

In this course, the students will

CO1:	Implement basic data structures such as arrays and linked list.
CO2:	Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.
CO3:	Implement various searching and sorting algorithms.
CO4:	Programs to demonstrate the implementation of various operations on stack and queue.

CO5:	Implementation of Minimum Spanning tree problems in C++.

LAB: UNIX AND SHELL PROGRAMMING **SUBJECT CODE: P2CAC2P2**

In this course, the students will

CO1:	Describe the architecture and features of UNIX Operating System and distinguish it from other Operating System
CO2:	Demonstrate UNIX commands for file handling and process control.
CO3:	Write Regular expressions for pattern matching and apply them to various filters for a specific task.
CO4:	Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem
CO5:	Develop an ability to formulate regular expressions and use them for pattern matching.

INTRODUCTION TO INTERNET AND WEB DESIGNING

SUBJECT CODE: P1CAN21

In this course, the students will

CO1:	Select and apply mark up languages for processing, identifying, and presenting of information in web pages.
CO2:	Incorporate best practices in navigation, usability and written content to design websites that give users easy access to the information they seek.
CO3:	Combine multiple web technologies to create advanced web components.
CO4:	Conceptualize and plan an internet-based business that applies appropriate business models and web technologies.
CO5:	Use fundamental skills to maintain web server services required to host a website.

II MCA

Semester III

ACCOUNTANCY AND FINANCIAL MANAGEMENT

SUBJECT CODE: P1LCC11

In this course, the students will

CO1:	Provide knowledge regarding Double Accounting System, Accounting principles, Accounting rules, Preparation of Journal, Ledger and Trial Balance.

CO2:	Inculcate skill in preparing final accounts.
CO3:	Provide a basic knowledge about Management Accounting and techniques.
CO4:	Understand the Marginal Costing Techniques.
CO5:	Understand the concept of working capital and computation of working capital.

OPEN SOURCE TECHNOLOGY **SUBJECT CODE: P1LCC12**

In this course, the students will

CO1:	Understand the basics of PHP such as Syntax, Logical and Control Statements.
CO2:	Understand the PHP Arrays and Functions for Web Development.
CO3:	Understand the MySQL for Store user data in Web Development.
CO4:	Connect with PHP and MySQL for Interactive Web Applications.
CO5:	Implement Sessions and Cookies in PHP for user authentication.

JAVA PROGRAMMING **SUBJECT CODE: P1LCC13**

In this course, the students will

CO1:	Demonstrate the principles of object oriented programming concepts and solve simple problems using the fundamental syntax and semantics of the java programming language
CO2:	Understand the behavior of primitive data types, operators and decision & iteration control structures.
CO3:	Demonstrate the ability to use class and its types, constructor, overloading, overriding and arrays in a Java program.
CO4:	Understand the concept of package, interface, multithreading, and exception handling.
CO5:	Know file concept for input and/or output
CO6:	Acquire the knowledge about applet class and creating the applet animation programs.
CO7:	Develop simple graphical user interface for java programs using GUI components.

JAVA PROGRAMMING LAB **SUBJECT CODE: P1LCC1P1**

In this course, the students will

CO1:	Able to Create Java programs that may include basic data types and control flow constructs.
CO2:	Able to Create Java programs using object oriented class structures with parameters, constructors, and utility and calculations methods, including inheritance, test classes and exception handling.
CO3:	Able to Create Java programs using arrays and recursion.
CO4:	Able to Create Java programs manipulating Strings and text documents.
CO5:	Able to Create Java programs that include GUIs and event driven programming.

LAB: OPEN SOURCE PROGRAMMING **SUBJECT CODE: P1LCC1P2**

In this course, the students will

CO1:	Able to Collect data from HTML Forms and Processing it in PHP.
CO2:	Develop programs in PHP using Arrays and Functions.
CO3:	Create relational database to perform transactions in MySQL.
CO4:	Connect with PHP and MySQL for Interactive Web Applications.
CO5:	Able to Develop a Dynamic Web Applications using PHP with MySQL.

OBJECT ORIENTED ANALYSIS AND DESIGN **SUBJECT CODE: P1LCE11**

In this course, the students will

CO1:	Understand the importance of modeling concept for objects oriented development in system.
CO2:	Differentiate advance object-oriented approach from the traditional approach for design and development of System.
CO3:	Apply Unified Modeling Language (UML) for representation of an object-oriented system using different modeling views.
CO4:	Construct various UML models For Various development stages of System using the appropriate UML notation.
CO5:	Analyze and apply design issues to rectify the performance and good system design that is recognized by various object relationships.
CO6:	Identify, formulate and solve software development problems, software

	requirements, specification, software design, and implementation.

COMPUTER GRAPHICS **SUBJECT CODE: P1LCE12**

In this course, the students will

CO1:	Explain the Computer Graphics display technologies
CO2:	Analyze the basic output primitive drawing algorithms along with 2D transformation concepts to display the objects
CO3:	Apply the polygon filling algorithms to fill polygons with required colour.
CO4:	Apply the Line clipping and Polygon Clipping techniques
CO5:	Demonstrate the 3D transformation concepts to model an object
CO6:	Derive the projection transformations and explain the 3D object representation models

BIOMETRICS **SUBJECT CODE: P1LCE13**

In this course, the students will

CO1:	Understand the state-of-the-art in biometric technologies.
CO2:	Survey the currently available biometric systems.
CO3:	Explore ways to improve some of the current techniques.
CO4:	Learn and implement some of the biometrics authentication.
CO5:	Perform Evaluation and Comparison of various Biometrics techniques.

Semester IV

DATABASE MANAGEMENT SYSTEMS **SUBJECT CODE: P1LCC21**

In this course, the students will

CO1:	Master the basic concepts and understand the applications of database systems
CO2:	Design and create a good database and use various SQL operations
CO3:	Construct an Entity-Relationship (E-R) model from specifications and to transform to relational model.
CO4:	Construct unary/binary/set/aggregate queries in Relational Algebra.
CO5:	Know how to remove data redundancy by translating created relational model into normalized designs.
CO6:	Understand database systems theory and apply that knowledge to implement triggers, B+ trees for indexing and hashing in SQL.

CO7:	Handle effectively the transactions management, concurrency control and recovery system in the database

DATA COMMUNICATION NETWORKS **SUBJECT CODE: P1LCC22**

In this course, the students will

CO1:	Know the fundamental concepts of data communications such as signal handling, types, propagation and their transmission in greater detail.
CO2:	Know serial and parallel modes of data transmission, key concepts of multiplexing and gained thorough knowledge of algorithms in transmission errors.
CO3:	Classify the types of data transmission media, focusing various network topologies and routing algorithms. Also elucidates the theory behind OSI protocol stack.
CO4:	Acquire the knowledge of the digital telephony protocol of ISDN along with the basics of Medium Access Control Sub layer and know how X.25 protocol works in WAN network.
CO5:	Get an introduction of the idea of Internetworking and working of these devices, deals with how Internet and IP functions and various areas related to IP.

CLIENT-SERVER LAB **SUBJECT CODE: P1LCC2P1**

In this course, the students will

CO1:	Understand DBMS concepts, data models and Architecture.
CO2:	Use SQL for database management.
CO3:	Understand ER concepts and ER mapping to relational model
CO4:	Apply the concepts of relational algebra and calculus.
CO5:	Apply normalization process to construct the data base.
CO6:	Understand Concurrency and recovery strategies of DBMS

ADVANCED JAVA PROGRAMMING LAB **SUBJECT CODE: P1LCC2P2**

In this course, the students will

CO1:	Develop distributed applications using Remote Method Invocation.
CO2:	Write a server side java application called Servlet and JSP to catch for data sent from client, process it and store it on database.
CO3:	Create and use custom JSP tags
CO4:	Develop client/server applications, UDP and TCP/IP socket programming.

CO5:	Update and retrieve the data from the databases using SQL
CO6:	Develop server side programs in the form of Servlets.
CO7:	Access a Remote method using Java Native Interface.

DATA MINING AND WAREHOUSING **SUBJECT CODE: P1LCE21**

In this course, the students will

CO1:	Understand the concepts of data warehouse and data mining.
CO2:	Use data pre processing techniques to build data warehouse
CO3:	Analyze transaction databases for association rules.
CO4:	Use classification methods and prediction techniques on transaction databases.
CO5:	Understand various clustering techniques for categorizing data.
CO6:	Understand methods for outlier analysis.

ARTIFICIAL NEURAL NETWORK **SUBJECT CODE: P1LCE22**

In this course, the students will

CO1:	Understand the basic principles and applications of Artificial Intelligence
CO2:	Represent knowledge using various different techniques
CO3:	Understand the fundamentals of neural networks and identify which types of neural networks are used for discriminators, classifiers, computation
CO4:	Analyze training algorithms such as feed forward, back- propagation
CO5:	Understand how Neuro dynamics and Hopfield models are used in neural networks

MOBILE COMPUTING **SUBJECT CODE: P1LCE23**

In this course, the students will

CO1:	Understand the concept of Wireless LANs, PAN, Mobile Networks, and Standard bodies in mobile computing.
CO2:	Describe the Architecture of GSM, GPRS, SMS and its applications.
CO3:	Know the constraints to develop applications for Handheld Devices.
CO4:	Understand the Windows CE & IMS Architecture.
CO5:	Identify and Handle the Challenges in Multimedia Delivery over the Internet and Network Security.

INTRODUCTION TO INTERNET AND WEB DESIGNING

SUBJECT CODE: P1LCN2

In this course, the students will

CO1:	Select and apply mark up languages for processing, identifying, and presenting of information in web pages.
CO2:	Incorporate best practices in navigation, usability and written content to design websites that give users easy access to the information they seek.
CO3:	Combine multiple web technologies to create advanced web components.
CO4:	Conceptualize and plan an internet-based business that applies appropriate business models and web technologies.
CO5:	Use fundamental skills to maintain web server services required to host a website.

III MCA

Semester V

CRYPTOGRAPHY AND NETWORK SECURITY **SUBJECT CODE: P1LCC31**

In this course, the students will

CO1:	Identify and classify computer and security threats and develop a security model to prevent, detect and recover from attacks.
CO2:	Understand the concept of encryption and analyze the various symmetric encryption algorithms and asymmetric algorithms.
CO3:	Examine and understand the techniques and algorithms used for message authentication: MAC, Digital Signatures and Hash functions.
CO4:	Know how to deploy encryption techniques to secure data in transit across data networks.
CO5:	Identify the various kinds of malicious software and their related threats.
CO6:	Understand the principles behind design of firewalls.

PRINCIPLES OF COMPILER DESIGN **SUBJECT CODE: P1LCC32**

In this course, the students will

CO1:	Know about the basic structure of compiler which covers Lexical Analysis, and Finite State Machines which used in text editors.
CO2:	Be introduced to the basic concepts and terminology in programming languages and

	study the pattern recognition.
CO3:	Get the knowledge in Parsing and classify the various kinds of Parsers such as Operator Precedence, recursive Descent, and LR Parsing.
CO4:	Get thorough ideas of intermediate-code generation and know about syntax-directed approach and several translation schemes for programming language.
CO5:	Review various types of data structures of symbol table and also know the essential error recovery techniques and code optimization.
CO6:	Apply the techniques of code optimization and produce structured programs from unstructured ones and become program verifiers.

CLOUD COMPUTING **SUBJECT CODE: P1LCC33**

In this course, the students will

CO1:	Learn the knowledge of SPI architecture.
CO2:	Acquire knowledge about the services of cloud computing.
CO3:	Gain knowledge about the service providers of the cloud.
CO4:	Create instances and manipulate it with data centre in cloud computing.
CO5:	Know the security of data in cloud.
CO6:	Have deep knowledge about cloud computing and become cloud administrators, and data centre administrators.

LAB: SOFTWARE DEVELOPMENT **SUBJECT CODE: P1LCC3P1**

In this course, the students will

CO1:	Formulate a real world problem and develop its requirements.
CO2:	Develop a design solution for a set of requirements.
CO3:	Test and validate the conformance of the developed prototype against the original requirements of the problem.
CO4:	Work as a responsible member and possibly a leader of a team in developing software solutions.
CO5:	Self learn new tools, algorithms, and/or techniques that contribute to the software solution of the project.
CO6:	Generate alternative solutions, compare them and select the optimum one.

DOT NET PROGRAMMING LAB **SUBJECT CODE: P1LCC3P2**

In this course, the students will

CO1:	Work with console and windows applications in VB.NET
CO2:	Gain the knowledge about how to connect database connection with VB.NET
CO3:	Work with C# in console and windows applications in C#.Net framework
CO4:	Design webpage in ASP in DOTNET framework
CO5:	Implement the validation control in Webpage forms

DIGITAL IMAGE PROCESSING **SUBJECT CODE: P1LCE31**

In this course, the students will

CO1:	Review the fundamental concepts of a digital image processing system.
CO2:	Analyze images in the frequency domain using various transforms.
CO3:	Evaluate the techniques for image enhancement and image restoration.
CO4:	Categorize various compression techniques.
CO5:	Interpret Image compression standards.
CO6:	Interpret image segmentation and representation techniques.

EMBEDDED SYSTEMS **SUBJECT CODE: P1LCE32**

In this course, the students will

CO1:	Define and explain embedded systems and the different embedded system design technologies explain the various metrics or challenges in designing an embedded system.
CO2:	Design custom single – purpose processors using combinational as well as sequential logic.
CO3:	Discuss about optimizing single – purpose processors. Discuss about the basic architecture and operation of general purpose processors.
CO4:	Define and distinguish between a timer and a counter. Explain about various types of timers and Universal Asynchronous Receiver/ Transmitter.
CO5:	Discuss about the common memory types ROM and RAM. Explain and distinguish between different types of advanced RAM.
CO6:	Explain about the basics of interrupts. Explain the different architectures like Round Robin. Describe the Real – Time Operating System architecture.

ANDROID PROGRAMMING **SUBJECT CODE: P1LCE33**

In this course, the students will

CO1:	Understand the Architecture, Devices and Applications of Android.
CO2:	Understand the Android Activity Life Cycle and User Interface.
CO3:	Develop Interactive android Applications using Concepts such as Intents and Fragments.
CO4:	Develop android applications to manage user data using Databases, File Storage and Preferences.
CO5:	Able to Export an Application to Android Play store and reach globally.

SOFTWARE TESTING **SUBJECT CODE: P1CASL1**

In this course, the students will

CO1:	Study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
CO2:	Discuss various software testing issues and solutions in software unit test; integration, regression, and system testing.
CO3:	Learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.
CO4:	Expose the advanced software testing topics, such as object-oriented software testing methods, and component-based software testing issues, challenges, and solutions.
CO5:	Gain software testing experience by applying software testing knowledge and methods to practice-oriented software testing projects.

XML **SUBJECT CODE: P1CASL2**

In this course, the students will

CO1:	Able to understand and write well-formed XML documents
CO2:	Able to write the schema for the given XML documents in both DTD and XML Schema languages
CO3:	Able to format XML data to the desired format
CO4:	Able to parse XML documents by using DOM, SAX, and StAX
CO5:	Able to create, deploy, and call Web services using Java, PHP, C# .NET

PROJECT & VIVA-VOCE **SUBJECT CODE: P1CA4PV**

In this course, the students will

CO1:	Formulate a real world problem and develop its requirements.
CO2:	Develop a design solution for a set of requirements.
CO3:	Test and validate the conformance of the developed prototype against the original requirements of the problem.
CO4:	Work as a responsible member and possibly a leader of a team in developing software solutions.
CO5:	Self learn new tools, algorithms, and/or techniques that contribute to the software solution of the project.