COURSE OUTCOMES

DEPARTMENT OF INFORMATION TECHNOLOGY

SEMESTER: I

Subject Name: Introduction to IT and Digital Principles **Subject Code: U3NTC1**

In this course the students will

CO1:	Be aware of Computers and their usage, and also its basic components.
CO2:	Analyze the data into useful information with the help of modern CPU and Storage devices
CO3:	Understand the basics of Number system and Arithmetic operations in Bit level.
CO4:	Understand Arithmetic operations in any number system and apply various techniques to simplify the Boolean functions.
CO5:	Learn the basic knowledge of the Basic Gates and Combinatorial Logic circuits.
CO6:	Understand the Data Processing Circuits and Flip flops which help to create memory oriented designs.

Subject Name: Mathematical Foundations **Subject Code: U3MAA1N**

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:	Gain the knowledge on basic concepts of graph theory.

Subject Name: Lab: Web Designing **Subject Code: U2NTC1P1**

In this course the students will

CO1:	Acquire the skills on creating and designing the websites in HTML.

Subject Name: Lab: Office Automation **Subject Code: U3NTC1P2**

In this course the students will

CO1:	Understand the basic concepts of how to develop and decorate the documents and invitation cards by inserting tables, forms, clip art pictures and paragraph alignments in MS Word.
CO2:	Learn to create Mail Merge in MS Word.
CO3:	Design the worksheets with the essential information and use data filter, data sort, formulas, pivot charts and pivot tables in MS Excel.
CO4:	Understand the basic concept of MS PowerPoint slides using auto content wizard, various templates, auto play, audio and video effects.
CO5:	Learn to create databases, tables, records with validation rules and extract the records using data filter and various queries in MS Access.

Subject Name: Introduction to HTML **Subject Code: U2NTS1**

In this course the students will

CO1:	Be enlightened with the history of HTML and the basic procedures to design the homepage, HTML documents.
CO2:	Get the knowledge of HTML tags for designing body section of HTML documents with ordered and unordered lists.
CO3:	Learn to handle tables and style sheets creation in HTML.
CO4:	Learn to handle the frames creation in HTML.
CO5:	Learn to handle the forms creation in HTML.

VIRUDHUNAGAR HINDU NADARS' SENTHIKUMARA NADAR COLLEGE
(An Autonomous Institution Affiliated to Madurai Kamaraj University)
[Re-accredited with 'A' Grade by NAAC]
Virudhunagar – 626 001.

SEMESTER: II

Subject Name: Programming in C **Subject Code: U1NTC2**

In this course the students will

CO1:	Understand the fundamentals of C, data types, operators used in C, basic input and output Operations.
CO2:	Develop conditional and iterative statements to write C programs.
CO3:	Inscribe the important topics such as arrays and character arrays.
CO4:	Learn about the functions and structures used in C.
CO5:	Inscribe C programs using pointers and to allocate memory using dynamic memory management functions.

Subject Name: Basic Accounting **Subject Code: U1CEA2N**

In this course the students will

CO1:	Learn accounting Basic Terms.
CO2:	Learn double accounting
CO3:	Learn Recording of Transactions.
CO4:	Learn accounts for Posting from Journal and Balancing of Accounts.
CO5:	Understand accounting for final accounts and inventory accounting.

Subject Name: Lab: Programming in C **Subject Code: U2NTC2P1**

In this course the students will

CO1:	Promote the students to (learn practical knowledge, through lab exercises in basic input and output operations, decision making and looping, branching, arrays, functions, structures, pointers and files).

Subject Name: Lab: Tally **Subject Code: U1NTC2P2**

In this course the students will

CO1:	Make Tally Fundamentals familiar to the learner.
CO2:	Impart knowledge on Tally Groups, Ledgers, Voucher creation.
CO3:	Familiarise with BRS – Bank reconciliation in Tally 9.

SEMESTER: III

Subject Name: Data Structures **Subject Code: U2NTC31**

In this course the students will

CO1:	Be able to choose appropriate data structure as applied to specified problem definition.
CO2:	Gain knowledge on basic building blocks for creating efficient programs and learn how to store and manipulate data in linear data structure and non-linear data structures.
CO3:	Handle operations like searching, insertion, deletion, traversing mechanism etc., on various data structures.
CO4:	Learn the concept of last-in first-out (LIFO) and first-out (FIFO) data structure to implement operations on stacks and queue its applications.
CO5:	Develop non-linear data structure and implement the memory representation, traversal schemes and applications of graphs.

Subject Name: Object Oriented Programming with C++ **Subject Code: U1NTC32**

In this course the students will

CO1:	Understand the difference between object oriented programming and procedural oriented language and data types in C++.
CO2:	Understand the basic concepts of Object Oriented Programming and its benefits. Learn about the features of C++, tokens, expressions and control structures.
CO3:	Understand the functions in C++ and the significance of C++ - class, object, member function.
CO4:	Learn and work with special member functions constructor and destructor for initializing and destructing objects.
CO5:	Learn the reusability concept to extend classes – inheritance, virtual functions, polymorphism and file operations.

Subject Name: Lab: Computer Animation **Subject Code: U2NTC3P1**

In this course the students will

CO1:	Learn basic tools in Photoshop for creating and designing animation programs in an image by applying mirroring effect, blur filter, lighting effect filter and rainbow effect.
CO2:	Learn basic tools in Flash for developing applications in Flash using motion tween, shape tween, masking effect, layers. Implementing action scripts to play and stop an animation.

Subject Name: Lab: Programming in C++ **Subject Code: U2NTC3P2**

In this course the students will

CO1:	Gain knowledge in C++ and solve programs using classes and objects, constructors and destructors, friend functions, operator overloading, inheritance, polymorphism and file handling.

SEMESTER: IV

Subject Name: Java Programming **Subject Code: U2NTC41**

In this course the students will

CO1:	Gain knowledge about object oriented programming, java technology and its features and get exposure on java literals, data types, variables and operators.
CO2:	Implement programs using control flow statements, loop statements and arrays.
CO3:	Learn the basic building block of object oriented programming and object creation. Understand the principles of reuse the existing code and to arrange and manage classes using packages.
CO4:	Learn how to create objects for basic types and how to handle abnormal condition occurring in a program. Implement String classes and its methods.
CO5:	Implement input output data processing and learn how to execute more than one process at a time.

Subject Name: Operating Systems **Subject Code: U1NTC42**

In this course the students will

CO1:	Learn CPU scheduling algorithms used in operating system.
CO2:	Acquire the knowledge of memory management and deadlock handling algorithms.
CO3:	Learn the mechanisms involved in memory management in contemporary OS
CO4:	Learn about the process concepts and concurrency while executing processes.
CO5:	Understand the process of scheduling, inter-process communication, process synchronization, deadlock handling and the utilization of CPU.

Subject Name: Resource Management Techniques **Subject Code: U1MAA4N**

In this course the students will

CO1:	Understand origin & development of OR.
CO2:	Understand application of OR.
CO3:	Analyze the application of OR in second world war.
CO4:	Develop the skills in solving LPP using various methods.

Subject Name: Lab: Programming in Java **Subject Code: U2NTC4P**

In this course the students will

CO1:	Understand the basic approaches to the design of software applications.
CO2:	Apply the above concepts to design, implement and test a Java application of medium complexity, consisting of multiple classes.

SEMESTER: V

Subject Name: Dot Net Programming **Subject Code: U2NTC51**

In this course the students will

CO1:	Understand the .Net framework to build and deployment of enterprise application.
CO2:	Learn the fundamentals of developing modules application by using object oriented methodology using VB.Net.
CO3:	Learn to connect the data source management them in VB.Net application.

CO4:	Be capable of developing network application.
CO5:	Be able to create a web form with server control.

Subject Name: Data Communications and Networks **Subject Code: U2NTE51**

In this course the students will

CO1:	Be familiar with various components of a communication system used in various organizations, and how digital transmission work
CO2:	Learn various analog and digital transmission techniques and idea of multiplexing
CO3:	Handle the transmission errors, compression and encryption techniques
CO4:	Learn the transmission media types like guided media, unguided media, Network topology, switching and routing algorithms.
CO5:	Understand the protocol and its significance in communications and examine the three types of computer networks

Subject Name: Software Engineering **Subject Code: U2NTE52**

In this course the students will

CO1:	Gain knowledge about the concept of software engineering and understand the nature of the software development, planning processes of software phased life cycle models, cost models, and planning on organization structure.
CO2:	Understand the techniques of software cost estimations and software cost factors.
CO3:	Know the techniques, languages and processors of software requirements and specifications.
CO4:	Learn the fundamentals of software design concepts, notations, techniques, modules and modularization criteria.
CO5:	Be acquainted with the basics of testing and the concepts of software quality assurance and software configuration management process.

Subject Name: Lab: Dot Net Programming **Subject Code: U2NTC5P1**

In this course the students will

CO1:	Learn the concept and apply the knowledge to develop a real time application.

Subject Name: Lab: Web Programming **Subject Code: U2NTC5P2**

In this course the students will

CO1:	Gain practical knowledge in PHP, be exposed to the lab exercises in PHP arrays, loops, cookies, sessions, form handling & validation and database connectivity using MYSQL.

Subject Name: Web Technology **Subject Code: U2NTS51**

In this course the students will

CO1:	Understand the fundamentals of PHP, creating conditional structures and looping statements for repetitive tasks.
CO2:	Learn how to store data in array, using array functions, associative array and the concepts of creating functions.
CO3:	Know about the cookies, sessions and how to retrieve and process form submission data.
CO4:	Perform date and Time functions in PHP, creation, reading, appending and deletion of files and difference between include and require function.
CO5:	Learn to create database tables and query processing, read and process the data in a MYSQL database.

Subject Name: Unified Modeling Language **Subject Code: U2NTN51**

In this course the students will

CO1:	Understand the basic concepts of UML and Software design Evolution.
CO2:	Learn to draw activity diagrams with lifeline, constraints, notes etc.,
CO3:	Understand the classes and objects and learn to use associations, inheritance, exploring dependency relationships.

CO4:	Understand to create behavioral state machines and to draw components for producers and customers.
CO5:	Understand modeling nodes, Refactoring, Adding supporting documentation & Communication path.

SEMESTER: VI

Subject Name: Relational Database Management Systems **Subject Code: U2NTC61**

In this course the students will

CO1:	Understand the Fundamentals of database management systems, File Organization and File structures are presented using real life examples.
CO2:	Learn the concepts of database models and E-R diagrams are explained with the help of real world examples.
CO3:	Learn the concepts of normalization, denormalization, Relational algebra and relational calculus.
CO4:	Understand the Fundamentals of SQL, Tables, Views and Indexes.
CO5:	Develop queries and sub queries, and learn the database security.

Subject Name: Mobile Communication **Subject Code: U2NTC62**

In this course the students will

CO1:	Understand the basics of wireless technologies, computer communications and how a cellular communication system functions.
CO2:	Learn how the medium access control works and working principles of shared physical channel among set of nodes.
CO3:	Understand the basic aspects of the TCP/IP protocol and how a mobile database will adapt the traditional databases.
CO4:	Understand the routing protocols with mobile ad hoc network and their usage in sensor network.
CO5:	Be aware of available mobile operating system, J2ME, android SDK and M-commerce.

Subject Name: Computer Graphics **Subject Code: U2NTC63**

In this course the students will

CO1:	Learn the basic features of graphics hardware components and graphics software packages.
CO2:	Learn the picture generation procedure by examining device level algorithm for displaying 2D.
CO3:	Understand the picture-generation procedures by examining device level algorithms for displaying 2D primitives
CO4:	Learn the output function in graphics packages.
CO5:	Understand the basic display properties of primitives.
CO6:	Learn the methods for performing geometric transformation and how to incorporate transformation function into graphics packages.
CO7:	Understand a typical graphics pipeline.

Subject Name: Project a Viva – Voce **Subject Code: U1NT6PV**

In this course the students will

CO1:	Analyze end user requirements, identifying and implementing solutions to user requests.
CO2:	Apply algorithmic techniques in the project.
CO3:	Analyze technical requirements to determine resource requirements.
CO4:	Design, plan, budget and propose an IT project.
CO5:	Install technical hardware and software support to the project.
	Analyze and select application and operating system settings to create an optimal user environment.
	Identify and resolve technical problems using trouble-shooting methods.

Subject Name: Lab: Linux Programming **Subject Code: U2NTS6P1**

In this course the students will

CO1:	Gain knowledge about basic operating system concepts and effective command line usage.
CO2:	Learn the shell programming and get experience in shell programming
CO3:	Learn to execute C programs under Linux environment.
CO4:	Gain knowledge about awk program for text processing.

Subject Name: Lab: Relational Database Management System **Subject Code: U2NTS6P2**

In this course the students will

CO1:	Promote the students to learn practical knowledge to make the strong formal foundation in database concepts and PL/SQL.

Subject Name: Cloud Computing **Subject Code: U2NTS61**

In this course the students will

CO1:	Be introduced to cloud computing and its unique features.
CO2:	Understand the various architecture layers that make up the cloud computing stack.
CO3:	Know about the important characteristics of cloud computing networks and applications, including abstraction and virtualization.
CO4:	Understand cloud management and security.
CO5:	And out the factors involved in deciding to move an application to the cloud and the role of cloud storage in storing and processing data.

Subject Name: Multimedia **Subject Code: U1NTN61**

In this course the students will

CO1:	Learn the impact of multimedia technology, the development and distribution of multimedia.
CO2:	Learn the working principles of computers, relationship between the hardware, operating system and software for multimedia product.

CO3:	Understand the technical nature of computer graphics, how they are stored in data files, and how use them in multimedia products.
CO4:	Know how digital audio files are processed and stored, and also learn to use digital audio in multimedia products.
CO5:	Know how to create, and digital video edit and also how to apply them in multimedia products.

Subject Name: Information security **Subject Code: U2NTN62**

In this course the students will

CO1:	Understand information system, threads and discuss different types of cyber crimes with its preventing methods.
CO2:	Acquire solid knowledge of security and technical challenges in handheld devices.
CO3:	Learn e-Commerce security threads, preventing strategies and issues.
CO4:	Understand the cryptography, key cryptography and also learn the basic idea of digital signature.
CO5:	Learn the basics of cyber crime and its types, software piracy, and Virus Dissemination.

M.Sc. Information Technology

SEMESTER: I

Subject Name: Advanced C Programming **Subject Code: P16NTC11**

In this course the students will

CO1:	Learn the concept and rationale of pointers in simplest possible terms.
CO2:	Understand the relationship between pointers and strings. Also the usage of pointers in maintaining popular Data Structures like Stacks, Queues, Singly and doubly linked list.
CO3:	Learn the standard Data Structures like Circular Linked list, Binary Trees, Threaded binary trees and how they can be implemented using pointers.
CO4:	Learn to manipulate hardware oriented data - individual bits, the bitwise operators and advanced issues of C programming like issuing interrupts, rear and far pointers, pointers and typecasting.
CO5:	Learn the initiations in the world of TSRs systematically. How a TSR attaches itself to interrupts and its termination. Issues involved in doing interrupt 0X21.

Subject Name: Operating System Design **Subject Code: P16NTC12**

In this course the students will

CO1:	Learn to recognize computer components like processor, register, cache memory and operating system functions major activity.
CO2:	Learn the basic awareness of the process description, process control, execution of operating system.
CO3:	Be familiar with deadlock prevention, avoidance and deadlock detections.
CO4:	Understand the scheduling algorithms, multiple scheduling and real-time scheduling.
CO5:	Learn system processes like I/O buffering, Disk scheduling, disk cache, RAID and File Management

Subject Name: Data Structures and Algorithms **Subject Code: P16NTC13**

In this course the students will

CO1:	Learn principles of algorithm design and implement various operations on heap and learn the use of open addressing and characterizing run time complexity.
CO2:	Learn to design and analyze B trees and to characterize a graph in terms of strongly

	connected components.
CO3:	Learn to manipulate sets by applying different modes of operations such as union, intersection and difference.
CO4:	Understand classes P, NP, and NP-Complete.
CO5:	Understand design, implementation and analysis of parallel algorithms.

Subject Name: Lab: Data structure using C Pointer **Subject Code: P16NT1P1**

In this course the students will

CO1:	Design to implement the usage of pointers in maintaining popular data structures like stack, Queue, Single, circular and Doubly Linked list.
CO2:	Develop programs to implement the usage of pointers in standard Data Structures like Binary Tree, Heap tree and Graph traversals.
CO3:	Create programs to initiate in the world of TSR like printing the letter in lower case while pressing shift key simultaneously and when capslock key is in off mode, displaying real time clock.

Subject Name: Lab: Web Designing **Subject Code: P16NT1P2**

In this course the students will

CO1:	Learn the advanced capabilities and features of PHP for web site development.
CO2:	Learn to develop programs using arrays, loops, string handling functions, form validation and form handling in PHP
CO3:	Understand the manipulation of DDL and DML commands.
CO4:	Learn to develop applications using PHP and MYSQL connectivity.

Subject Name: Computer Networking Security **Subject Code: P16NTE11**

In this course the students will

CO1:	Learn System security which includes buffer overflow, malicious programs, Firewalls, Intrusion detection systems.
CO2:	Understand the concept of coincidence, types of conventional algorithms, AES and DES.

CO3:	Learn asymmetric key algorithms like RSA, Rabin, Elgomal and Elliptic curve cryptography.
CO4:	Understand the standard hash functions, and digital signature.
CO5:	Understand the concepts of password based authentication, Challenge-response methods and key management techniques, Kerberos, public key distributions.

Subject Name: Cyber Forensics **Subject Code: P16NTE12**

In this course the students will

CO1:	Understand the concept of Network layer security, Transport layer security and IPSec protocol.
CO2:	Learn E-Mail security, Firewall, pgp-s, trusted systems and identify the roles of firewall, types of firewall, E-Commerce transactions.
CO3:	Take up the computer forensics and investigation as profession.
CO4:	Understand the basic Evidence collection and forensics tools, incident scenes.
CO5:	Gain exposure of the Process of Analysis and Data Validation.

SEMESTER: II

Subject Name: Advanced Java Programming **Subject Code: P16NTC21**

In this course the students will

CO1:	Learn to establish database connection and in distributed applications.
CO2:	Implement the user interaction with an item in UI and GUI.
CO3:	Learn how to position the components in a window.
CO4:	Learn how to position the components in a window.
CO5:	Learn to establish client server communication and to create web application and enterprise application.

Subject Name: Software Testing **Subject Code: P16NTC22**

In this course the students will

CO1:	Learn to apply software engineering practice over the entire system lifecycle.
CO2:	Test the functional requirements of the system.
CO3:	Learn to test adequacy assessment using control flow, data flow and program mutation works.
CO4:	Gain knowledge to find greatest possible number of errors with a manageable amount of effort applied over a realistic time span.
CO5:	Learn to monitor and measure the test activity.

Subject Name: Python Programming **Subject Code: P16NTC23**

In this course the students will

CO1:	Learn to work with the Variable, Expression, statement, conditions, functions and recursion.
CO2:	Learn Fruitful function, Debugging, Iteration and strings.
CO3:	Understand the List sequence, list operation, method, map, filter Dictionaries, looping and reverse lookup.
CO4:	Understand the basics of file reading, file writing, and format operator.
CO5:	Understand the pure functions, modifiers, prototyping, debugging, printing objects, overloading and inheritances.

Subject Name: Lab: Advanced Java Programming **Subject Code: P16NT2P1**

In this course the students will

CO1:	Understand swing-based GUI, client/server applications, update and retrieve the data from the databases, distributed applications, server side programs.
CO2:	Apply the above to design, implement and test a Java application.

Subject Name: Lab: Python Programming **Subject Code: P16NT2P2**

In this course the students will

CO1:	Understand the functions of decision making statements.
CO2:	Learn to create program with minimum coding using looping statement.
CO3:	Perform file reading, file writing and format operation.
CO4:	Learn to sort out the data in ascending or descending using algorithms.
CO5:	Learn to access the persistent data using mySql database.

Subject Name: IT and Data Computations **Subject Code: P2NTN2**

In this course the students will

CO1:	Learn the history of computers along with its storage devices.
CO2:	Learn the basics of Relational Database Management System with its commands.
CO3:	Learn the basics of Multimedia components and the Networks.
CO4:	Understand the basics of SPSS package and its fundamentals.
CO5:	Be exposed the advancements in SPSS package such as Regression and other testing strategies.

SEMESTER: III

Subject Name: Android Programming **Subject Code: P16NTC31**

In this course the students will

CO1:	Learn the basics of mobile app development and have ability to setup android development environment, implement the fundamental building block of android app.
CO2:	Learn how to create view group in android app and implement the user interaction with an item in UI.
CO3:	Understand the customization of home screen in android device and learn the flexible user interface entity.
CO4:	Learn to keep the users up to date on events and get exposure in transition framework to animate views.
CO5:	Implement the variety of common media types such as audio, video and learn how to

	store and manipulate data in database.

Subject Name: Data Mining **Subject Code: P16NTC32**

In this course the students will

CO1:	Learn the introduction of data mining and warehousing from the view point of its end-users.
CO2:	Understand various algorithms of major data mining technologies of frequent pattern mining and classification along with their applications.
CO3:	Learn the applications of clustering methods and pattern discovery techniques of various kinds of real world data such as relational, spatial, time-series, text, web and multimedia data.
CO4:	Learn the architecture of data warehouse, ETL and modeling of data warehouse.
CO5:	Understand the query processing on data warehouse and case studies which enable us to analyze the potential of pattern discovery technologies.

Subject Name: Principles of Compiler design **Subject Code: P16NTC33**

In this course the students will

CO1:	Learn the basic difference between Compilers and Translators and Lexical analysis
CO2:	Learn to do syntax analysis with the parsed data that are obtained in the previous phase.
CO3:	Perform Parsing with the help of LR, LL, LALR and SDT.
CO4:	Learn to create symbol table to store data, after that do Error correction and Optimization.
CO5:	Learn to generate code after optimizing the code sequence.

Subject Name: Lab: Android Programming **Subject Code: P16NT3P1**

In this course the students will

CO1:	Understand the basic UI design and API integration of android applications.
CO2:	Apply the above to design, implement and test an Android application.

Subject Name: Lab: Network **Subject Code: P16NT3P2**

In this course the students will

CO1:	Understand the basics of TCP/IP with the help of C Program
CO2:	Learn to construct a Network with the help of protocols
CO3:	Understand client server application for the unicast and multicast program.
CO4:	Learn to check the network connectivity through Java Program
CO5:	Analyze real time experience through network simulator

Subject Name: TCP/IP Protocols **Subject Code: P16NTE31**

In this course the students will

CO1:	Understand working knowledge about the OSI Layered architecture, LAN, MAN and WANs.
CO2:	Understand the Class full address, sub net address, classless address, routing of IP packets.
CO3:	Learn the basics of ARP and their packet, operation, encapsulation, fragmentations.
CO4:	Be familiar with group message, user datagram protocol, checksum calculation and control blocks.
CO5:	Understand the TCP Services, Delivery, flow control, error control and unicast routing protocol

Subject Name: Wireless Sensor Network **Subject Code: P16NTE32**

In this course the students will

CO1:	Understand the basics of Networked Wireless sensor devices and Network deployment.
CO2:	Learn Localization and Synchronization Techniques along with its issues.
CO3:	Understand the concept of Medium-access and sleep scheduling with MAC protocols.
CO4:	Learn the Sleep based topology control and Routing.
CO5:	Analyze the technology through Data centric Networking and Reliability Congestion control.

SEMESTER: IV

Subject Name: Text Mining **Subject Code: P16NTC41**

In this course the students will

CO1:	Learn text mining is a way of mining text for some specific task.
CO2:	Understand the process of mining involves extraction, prediction and tokenization.
CO3:	Learn to analyze after extracting the text, do prediction with the captured data.
CO4:	Learn to analyze similarity with well formed clustering and classification algorithms.
CO5:	Understand the useful results and apply filtering on the right domain.

Subject Name: Cloud Computing **Subject Code: P16NTC42**

In this course the students will

CO1:	Learn about cloud computing, the various architecture layers that make up the cloud computing stack and cloud computing services.
CO2:	Learn the important characteristics of cloud computing networks and applications, including abstraction and virtualization.
CO3:	Learn to explore cloud infrastructures cloud management and security.
CO4:	Learn Service Oriented Architecture, the factors involved in deciding to move an application to the cloud and the role of cloud storage in storing and processing data.
CO5:	Learn to use the mobile cloud, working with mobile devices and mobile web services.

Subject Name: Internet of Things **Subject Code: P16NTC43**

In this course the students will

CO1:	Learn building blocks of IoT and their characteristics and their real-world applications.
CO2:	Understand programming aspects of IoT with a view to developing rapid prototypes of complex IoT applications.
CO3:	Understand Python programming, Packages, frameworks and cloud services and Amazon Web Services that can be used to develop IoT systems.
CO4:	Learn Raspberry Pi device is chosen for various IoT domains viz., home automation, smart environment smart cities, logistics, Retail, smart agriculture, industrial control and smart health.
CO5:	Learn the advanced topics on data analytics and tools for IoT.

Subject Name: Project & Viva – Voce **Subject Code: P16NT4PV**

In this course the students will

CO1:	The students should be able to apply mathematical, scientific, to identify, understand, evaluate and formulate solutions to meet industry needs.
CO2:	The students should experience to solve industry oriented problems regarding Information Technology field.
CO3:	The students will be provided with an educational foundation that prepares them to become entrepreneurs in the field of software development.
CO4:	The students should use and apply current technical concepts and practices in the core information technologies.

M.Sc. Computer Science

SEMESTER: I

Subject Name: Advanced C Programming **Subject Code: P1CSC11**

In this course the students will

CO1:	Learn the concept and rationale of pointers in simplest possible terms.
CO2:	Learn the relationship between pointers and string and also able to use pointers in maintaining popular Data Structures like Stacks, Queues, Singly and doubly linked list.
CO3:	Learn the standard Data Structures like Circular Linked list, Binary Trees, Threaded binary trees and how they can be implemented using pointers.
CO4:	Learn to manipulate hardware oriented data - individual bits, the bitwise operators and advanced issues of C programming like issuing interrupts, rear and far pointers, pointers and typecasting, addressing scheme.
CO5:	Learn the initiations in the world of TSRs systematically. How a TSR attaches itself to interrupts and its termination. Issues involved in doing interrupt 0X21.

Subject Name: Data Structures and Algorithms **Subject Code: P3CSC12**

In this course the students will

CO1:	Learn the principles of algorithm design and implement various operations on heap and learn the use of open addressing and characterizing run time complexity.
CO2:	Have ability to design and analyze B trees and to characterize a graph in terms of strongly connected components.
CO3:	Learn to manipulate sets by applying different modes of operations such as union, intersection, difference.
CO4:	Understand the classes P, NP, and NP-Complete and to prove that a certain problem is NP-Complete.
CO5:	Learn the design, implementation and analysis of parallel algorithms.

Subject Name: Theory of Computation **Subject Code: P2CSC13**

In this course the students will

CO1:	Be introduced to the fundamental concepts of formal languages and automata. Finite state machines and other machines were introduced.
CO2:	Gain knowledge about regular languages which form a basis for Finite Automata, we need to be aware of Regular set and expressions.
CO3:	Express the values in the form of parse tree.
CO4:	Use of normal forms which can make the parse tree more efficient
CO5:	Understand well developed model by Turing has been learnt with the help of tape drive.

Subject Name: Lab: Data Structures Using C Pointer **Subject Code: P1CSC1P1**

In this course the students will

CO1:	Design programs to implement the usage of pointers in maintaining popular data structures like stack, Queue, Single, circular and Doubly Linked list.
CO2:	Develop programs to implement the usage of pointers in standard Data Structures like Binary Tree, Heap tree and Graph traversals.
CO3:	Create programs to initiate in the world of TSR like printing the letter in lower case

	while pressing shift key simultaneously and when caps lock key is in off mode, displaying real time clock.

Subject Name: Lab: Programming in Dot Net **Subject Code: P2CSC1P2**

In this course the students will

CO1:	Gain hands-on exercise to build a Database driven application.

Subject Name: Dot Net Programming **Subject Code: P2CSE1**

In this course the students will

CO1:	Understand the .Net framework to build and deployment of enterprise application.
CO2:	Understand the fundamentals of developing modules application by using object oriented methodology using VB.Net.
CO3:	Learn to connect the data source management in VB.Net application.
CO4:	Learn to develop network application.
CO5:	Learn to develop web application using combination of client side and server side technology.

SEMESTER: II

Subject Name: J2EE Programming **Subject Code: P2CSC21**

In this course the students will

CO1:	Learn to enable the students to understand the Java & J2EE Platform and review the XML fundamentals.
CO2:	Gain knowledge in servlet programming, JSP Basics and JSP Tag extensions in the presentation layer.
CO3:	Learn ACID properties of Java Transactions, transaction models, Java Transaction API architecture and examining JNDI and directory services.
CO4:	Understand the explanation of session beans and business logic, working of entity beans and Message Driven Beans.
CO5:	Learn different types of JDBC drivers, working with result sets, connection pools and

	J2EE connector architecture in the data tier.

Subject Name: Computer Architecture and Parallel Processing Subject Code: P2CSC22

In this course the students will

CO1:	Understand the computer architecture by studying the evolution of computing and the changes that have led to obtain high performance computing via parallelism. Navigating a number of system configuration for multi processors.
CO2:	Understand shared memory, message passing systems, cache coherence protocols, architecture and network models of message passing systems.
CO3:	Understand abstract models, algorithms and complex analysis, shared memory abstract model (PRAM), parallel algorithms and their complexities.
CO4:	Understanding the Parallel Virtual Machine programming system, portable distributed parallel programs developed using Message Passing Interface Standard.
CO5:	Understand the probability of allocating tasks to processing units, the scheduling problem in several of its variations.

Subject Name: Relational Database Management Systems Subject Code: P2CSC23

In this course the students will

CO1:	Learn the Fundamentals of relational database management systems, Relational model and SQL
CO2:	Understand the concepts of database design and E-R models
CO3:	Learn the concepts of object based databases, XML and a variety of data-access techniques indexing, hashing and B+ -Tree indices
CO4:	Understand the Fundamentals of Transactions, Concurrency control and Recovery system.
CO5:	Learn the concepts of database system architecture, Parallel Databases and Distributed databases.

Subject Name: Lab: RDBMS **Subject Code: P2CSC2P1**

In this course the students will

CO1:	Learn practical knowledge to make the strong formal foundation in database concepts and PL/SQL.

Subject Name: Lab: J2EE Programming **Subject Code: P2CSC2P2**

In this course the students will

CO1:	CO1: Gain practical knowledge, through lab exercises in JDBC, Java Servlet, RMI and JSP.

Subject Name: Data Management Techniques **Subject Code: P2CSN2**

In this course the students will

CO1:	Learn the basics of database, entity and models
CO2:	Learn to develop query in database with the help of SQL commands and PL/SQL programs.
CO3:	Understand the basics of Cloud computing and its Architectures.
CO4:	Learn the security mechanisms and Automations in cloud services
CO5:	The Enterprise Resource Planning and its tools.

SEMESTER: III

Subject Name: Data Communication and Networks **Subject Code: P2CSC31**

In this course the students will

CO1:	Understand various components of a communication system used in various organizations, and digital transmission.
CO2:	Learn various analog and digital transmission techniques and conversions.
CO3:	Understand the guided and unguided media and their types.
CO4:	Explore the knowledge of Data link layer and their functions.
CO5:	Learn to work with the Error detection and correction methods.

Subject Name: Software Testing **Subject Code: P2CSC32**

In this course the students will

CO1:	Learn to effectively apply software engineering practice over the entire system lifecycle.
CO2:	Test the functional requirements of the system.
CO3:	Learn about the test adequacy assessment using control flow, data flow and program mutation works.
CO4:	Understand the greatest possible number of errors with a manageable amount of effort applied over a realistic time span.
CO5:	Learn to monitor and measure the test activity.

Subject Name: Principles of Compiler Design **Subject Code: P1CSC33**

In this course the students will

CO1:	Learn the basic difference between Compilers and Translators and Lexical analysis
CO2:	Understand syntax analysis with the parsed data
CO3:	Perform Parsing with the help of LR, LL, LALR and SDT.
CO4:	Create symbol table to store data, and also able to learn Error correction and Optimization.
CO5:	Generate code after optimizing the code sequence.

Subject Name: Lab: Python Programming **Subject Code: P2CSC3P1**

In this course the students will

CO1:	Understand the functions of decision making statements.
CO2:	Learn to program with minimum coding using looping statement.
CO3:	Be able to perform file reading, file writing and format operation.
CO4:	Learn to sort out the data in ascending or descending using algorithms.
CO5:	Learn to access the persistent data using mySql database.

Subject Name: Lab: Open Source Programming **Subject Code: P2CSC3P2**

In this course the students will

CO1:	Gain practical knowledge in open source programming languages like Linux and PHP
CO2:	Demonstrate the use of shell commands and file systems.
CO3:	Understand the concepts of shell scripting.
CO4:	To be able to learn PHP syntax, arrays, loops and form validation.
CO5:	Learn to design and develop dynamic database driven web pages.

Subject Name: Wireless Communication **Subject Code: P1CSE31**

In this course the students will

CO1:	Understand the Applications and Requirements of Wireless services.
CO2:	Learn Transmission modes, Attenuation and Channel basics.
CO3:	Learn the structure of wireless communication link and Modulation formats.
CO4:	Understand the diversity and combination of signals speech coding.
CO5:	Understand the concepts of duplex, Multiplexing and GSM.

Subject Name: Operating System Design **Subject Code: P1CSE32**

In this course the students will

CO1:	Learn the basics of Operating system and its pre history.
CO2:	Understand the concept of process, Kernel, Concurrency and Multiplexing.
CO3:	Learn the basics of Deadlock and Memory management schemes.
CO4:	Understand the concept of Uniprocessor, Multiprocessor and Real time scheduling.
CO5:	Understand the concepts of Input Output Management and Disk Scheduling.

Subject Name: Computer Networking Security **Subject Code: P1CSE33**

In this course the students will

CO1:	Learn System security which includes buffer overflow, malicious programs, Firewalls, Intrusion detection systems.
CO2:	Understand the concept of coincidence, types of conventional algorithms, AES and

	DES.
CO3:	Learn asymmetric key algorithms like RSA, Rabin, Elgomal and Elliptic curve cryptography.
CO4:	Understand the standard hash functions, and digital signature.
CO5:	Understand the concepts of password based authentication, Challenge-response methods and key management techniques, Kerberos, public key distributions.

SEMESTER: IV

Subject Name: Soft Computing **Subject Code: P1CSC41**

In this course the students will

CO1:	Learn the basics of soft computing, which mainly deals with Artificial Neural Networks, Fuzzy Logic and Genetic Algorithms.
CO2:	Understand Artificial Neural Networks with Machine Learning process which may involve Supervised, Unsupervised and Reinforcement Learning methods.
CO3:	Learn to process in supervised manner with the help of ADALINE and MADALINE.
CO4:	Gain knowledge on Fuzzy Logics which helps us to take Strategic decisions in a certain situation.
CO5:	Understand Genetic Algorithms mimic the properties of human beings to take strategic decisions which helps in generating many real time solutions.

Subject Name: Data Mining and Warehousing **Subject Code: P1CSC42**

In this course the students will

CO1:	Learn the introduction to data mining and warehousing.
CO2:	Understand various algorithms of major data mining technologies of frequent pattern mining and classification along with their applications.
CO3:	Learn the applications of clustering methods and pattern discovery techniques of various kinds of real world data such as relational, spatial, time-series, text, web and multimedia data.
CO4:	Learn the architecture of data warehouse, ETL and modeling of data warehouse.

CO5:	Understand the query processing on data warehouse and case studies which helps to analyze the potential of pattern discovery technologies.

Subject Name: Project a Viva – Voce **Subject Code: P1CS4PV**

In this course the students will

CO1:	An ability to apply knowledge of computing and mathematics appropriate to the project.
CO2:	An ability to analyze a problem, and identify and define the computing requirements.
CO3:	An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
CO4:	An ability to use current techniques, skills, and tools necessary for computing practice.
CO5:	An ability to use and apply current technical concepts and practices in the core information technologies.