COURSES OUTCOME - B.Sc. COMPUTER SCIENCE

I B.Sc. – Semester I

PROGRAMMING IN C **SUBJECT CODE: U22CSC11**/ U2CSC11

In this course, the students will

COs	CO Statement
CO1	Know the structure of a computer and its functioning. Learn to develop programs through algorithms and flowchart. Know the C character set, constants, variables and data types. Know how variables and constants are used in a C program. Know the various built-in operators, bitwise and special operators, operator precedence and how associative rules are applied. Determine how arithmetic expressions are evaluated.
CO2	Know how the character is read and written using formatted and in unformatted form. Know decision making with different if statement, switch statement and conditional operator. Know the unconditional branching
CO3	Know the purpose of looping. Know the structure and usage of while loop, do loop, and for loop.
CO4	Know about the purpose of array, different types of array and how it is to be used. How to use string variables, strings and different string handling functions and its usage. Know how the arithmetic operations can be used in on strings.
CO5	Know about user defined function and how it is differed from built-in function. Know how the function to be declared, defined and called. Know about scope and life time of variables.

MATHEMATICAL FOUNDATION 1 **SUBJECT CODE: U22MAAC11**/ U2MAA1C

In this course, the students will

COs	CO Statement
CO1	Able to apply the rules of propositional logic and rules of inference in verifying the validity of an argument or set of statements.
CO2	Well versed in using graph models for several problems in Science and Engineering such as Networks analysis, Scheduling problem, social networks, etc., to get solutions.
CO3	Well equipped in solving problems which are in recursive nature by the methods of recurrence relation.
CO4	Able to use / develop suitable algorithms for finding various closures of a relation which are vital in the field of networks.
CO5	Potential enough to use the concept of eigen values and eigen vectors in communication networks, designing, manufacturing, image processing and so on.

LAB: C PROGRAMMING **SUBJECT CODE: U22CSCP11/** U3CSC1P

COs	CO Statement
CO1	To develop programming skill in assignment statement, decision making statement, loop structure and switch structure
CO2	To develop programming skill in one dimensional array and two dimensional array
CO3	To develop programming skill in string handling and user defined function

DIGITAL PRINCIPLES AND APPLICATIONS **SUBJECT CODE: U22CSC12**

In this course, the students will

COs	CO Statement
CO1	To understand number systems , codes and conversion as well as logic gates
CO2	To facilitate understanding of Boolean simplification in logic circuit design
CO3	To know the applications of different combinational logic circuits
CO4	To understand the logic circuit Adder and binary level arithmetic manipulation
CO5	To know the basic operation of Flip Flop and design of sequential logic circuits using it.

Semester II

ADVANCED PROGRAMMING IN C **SUBJECT CODE: U22CSC21/** U2CSC21

In this course, the students will

COs	CO Statement
CO1	Know how the structures are used in C Language. Know how the members of the structures are accessed. Know how structure is stored in an array and accessed. Know the Union and how its members are accessed and stored in the memory.
CO2	Know the concept of pointer, how it is used in a program, array, functions and structures.
CO3	Know what is File, why do we need?, Know the usage of sequential file and random file and how it can be accessed.
CO4	Know about dynamic memory allocation and its usage. Know the linked list concept and how it is implemented.
CO5	Know about pre-processor, macro substitution, file inclusion, compiler control directives and pre-processor directives. Know bitwise logical operators, shift operators, ones complement operator, masking and how it is used in programming

MATHEMATICAL FOUNDATION II **SUBJECT CODE: U22MAA21C** /U4MAA2C

In this course, the students will

COs	CO Statement
CO1	Extract various parameters like mean, median, mode and Standard deviation etc., according to the types of sampled data.
CO2	Pick out more stabled data among various observations by analyzing the factors like standard deviation, correlation coefficient and coefficient of

	variance.
CO3	Understand the concept of random variables, probability density function, expectation of a random variable and essential properties.
CO4	Able to frame as well as test the hypothesis an hence able to Interpret and demonstrate the behaviour/happening of the population under consideration.
CO5	Apply statistical tools like t-test, F-test for large sample and χ^2–test for small samples to get prediction/details about the population from the samples. Able to help in prediction and formulation of suitable policies in Trading issues, Industry or Commercial problems, economic crisis, Science and engineering related problems.

LAB: ADVANCED PROGRAMMING IN C

SUBJECT CODE: U22CSCP21/ U3CSC2P

COs	CO Statement
CO1	To get programming practice in structure and structure array
CO2	To get programming practice in Pointer concept
CO3	To get programming practice in FILE concept
CO4	To get programming practice in Dynamic memory usuage

COMPUTER ORGANIZATION **SUBJECT CODE: U22CSC22**

In this course, the students will

COs	CO Statement
CO1	Know how the computer operations are specified with register transfer statements and how these are executed with clock pulses. Know about microprogramming and designing control unit.
CO2	Know about how the registers communicate with the ALU, the operations of the memory stack, different instruction formats, addressing modes and RISC
CO3	Know about different arithmetic algorithms implement with digital hardware
CO4	Know about. different peripheral devices and how these devices communicate with each other
CO5	Know about different memory and its need, implementation

COURSE OUTCOME

SEMESTER III

JAVA PROGRAMMING

Subject Code: U3CSC31

- The subject helps the students to understand Core Java features and to develop skills regarding.

PROGRAMMING IN JAVA

Subject Code: U1CSC3P1/U2CSC3P

- To develop the skill to write a computer program to solve specified problems using pure object oriented concepts.

DATA STRUCTURES

Subject Code: U2CSC32

- This subject focuses on the concepts, Operations and Applications of different Data Structures namely Array, Linked List, Stack, Queues, Graph and Tree.

ALLIED 3 – RESOURCE MANAGEMENT TECHNIQUES

Subject Code: U2MAA3C

- To provide the student with the concept of operations research techniques and problem solving in LPP, Simplex method, Primal-dual Simplex method, Assignment and transportation Problem.

SEMESTER IV

ADVANCED JAVA PROGRAMMING

Subject Code: U3CSC41

- This subject helps the students to understand advanced concepts of JAVA technology such as Applet, Graphics, AWT, Event Handling, Servlet, Networking & RMI and JDBC

LAB: PROGRAMMING IN ADVANCED JAVA

Subject Code: U3CSC4P

- To develop the skill to write a computer program to solve specified problems using advanced features in JAVA

OPERATING SYSTEMS

Subject Code:U2CSC42

- The subject gives exposure to Operating systems concepts and its components at the introductory level.

ALLIED 4 – NUMERICAL METHODS

Subject Code: U2MAA4C

- To give better skills for solving mathematical problems by numerical methods in the area algebraic equation, simultaneous, equations, interpolation, differentiation, integration& differential equations.

COURSE OUTCOME

SEMESTER V

COMPUTER ALGORITHMS

Subject Code: U2CSC51/ U1CSE54

CO1: To develop efficient programs in terms of execution time and memory space.
CO2: Analyze the developed programs to compute order of computing time.
CO3: To develop programs based on the Algorithmic techniques namely Divide and conquer, Dynamic programming, Greedy method, Backtracking and Branch and Bound.
CO4: Know the importance of minimizing computing time and how these algorithmic techniques make the program execution faster.

LAB: PHP and MYSQL

Subject Code: U1CSC5P1

CO1: To describe the PHP scripting language, and create basic PHP scripts using proper PHP syntax.
CO2: To create elaborate scripts, write HTML forms, and program PHP to handle the form data.
CO3: How to use PHP to create dynamic Web sites that are responsive to users and can alter content based on differing situations.
CO4: Develop the competence to create databases and tables, and sort and retrieve data using SQL and MySQL.
CO5: Understand the usage of PHP and MySQL in dynamic web development.
CO6: Enrich the knowledge of PHP language data types, logic controls, built-in and userdefined functions.
CO7: Make the students learn how to write server-side Web applications.
CO8: Gain the PHP programming skills needed to build interactive, data-driven sites successfully
CO9: Explore working with form data using cookies and sessions.

LAB: PYTHON IN PROGRAMMING

Subject Code: U3CSC5P2

CO1	Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python
CO2	Express different Decision Making statements and Functions
CO3	Interpret Object Oriented Programming in Python
CO4	Understand and summarize different File handling operations
CO5	Understand Mutithreading and Regular expressions Concepts in Python
CO6	Explain how to design GUI Applications in Python and evaluate different database operations
CO7	Design and develop Client Server network applications using Python

System Software

Subject Code: U2CSE51

CO1	Understand different processor architectures and system-level design processes.
CO2	Design, analyze and implement one pass, two pass or multi pass assembler
CO3	Interpret the design concepts of Loaders and Linkers.
CO4	Attain Knowledge in Macro Processors functions and its features
CO5	Acquire the knowledge of compiler & its features

COMPUTER NETWORKS

Subject Code: U2CSE52

CO1: Provide foundation knowledge of Network Hardware and Network Software
CO2: Give an in-depth knowledge about ISO/OSI and TCP/IP protocol stacks
CO3: Classify type of media and IEEE LAN standards
CO4: Present various types of error handling mechanisms
CO5: Gain Knowledge on routing algorithms as well as application layer functions

DATA MINING

Subject Code: U1CSE53

CO1: Understand the essentials of database and knowledge base.
CO2: Analyze the architecture of data mining and its components educated.
CO3: Inculcate the effective ways of data pre-processing educated to students.
CO4: Make the students know the importance association mining educated to students.
CO5: Learn the essentials of classification mining.
CO6: Impart the knowledge on cluster mining and different clustering techniques.
CO7: Elaborate text mining, spatial mining, web mining etc.

DATABASE MANAGEMENT SYSTEMS

Subject Code: U2CSE54

CO1: Educate the students on the essentials of database and database components.
CO2: The architecture of database and the languages used to maintain DBMS was educated.
CO3: To find the effective ways of modeling a database.
CO4: To recognize the importance of relational data models and its operation educated.
CO5: To acquire the knowledge on relational algebra and relational calculus to know the procedural and declarative ways of manipulating of database.
CO6: To enrich the students on functional dependencies and the different ways of normalizing a database.
CO7: Create awareness the students on effectively protecting the database by giving exposure of on transaction processing, concurring control techniques and database security.
CO8: Make the students aware of the fundamentals of database and its effective management.

INFORMATION SECURITY

Subject Code: U1CSE55

CO1: Give the foundation of information security and its underlying technologies
CO2: Provide a wide coverage of the issues and attacks in information security
CO3: Learn how to deal with security analysis and design pertaining to information security
CO4: Enumerate the logical and physical design of information security systems

CLOUD COMPUTING

Subject Code: U2CSE56

- To understanding cloud computing in different ways.
- To evaluate cloud based solutions against the time, energy, expense required to leverage them.
- To gain knowledge about how to access the cloud.
- To know the future of cloud computing

LAB: AngularJS Programming

Subject Code: U2CSS5P1

CO1 Implement built-in directives in AngularJS

CO2 Interpret the usage of filters

CO3 Understand the Angular core module

CO4 Build Angular forms

CO5 Create a Custom directives and Custom filters

SBE- EMPLOYABILITY SKILLS

Subject Code: U1PS51

- To enrich the Employability Skills by imparting Reasoning skills, Aptitude skills and General Knowledge.

NME 1 -LAB: Office Automation

Subject Code: U3CSN5P

CO1	Manipulate the text using the available option
CO2	Demonstrate the working of advanced features
CO3	Perform calculation based on the user requirements
CO4	Prepare data for the presentations

SEMESTER VI

SOFTWARE ENGINEERING

Subject Code: U2CSC61 / U1CSC51

CO1: Know the different approaches of developing an efficient software.
CO2: Facilitate the knowledge of technological and managerial aspect of incorporating software.
CO3: Aware the development of process of software.
CO4: Develop the skills in cost estimation.
CO5: Learn how to fulfill good software requirements specification.
CO6: Delineate the ways of designing a software product effectively.
CO7: Understand the different validation and verification techniques of software testing.
CO8: Know the different ways of maintaining software.
CO9: Develop a wholesome approach to define and develop qualitative software.

Computer Graphics and Digital Image Processing

Subject Code: U3CSC62

CO1	Acquire knowledge in the core concepts of computer graphics
CO2	Understand the various algorithms for drawing output primitives.
CO3	Gain knowledge in the fundamentals of Digital Image Processing
CO4	Examine intensity transformations and spatial filtering.
CO5	Interpret image segmentation and representation techniques.

MOBILE COMPUTING

Subject Code: U2CSC63

CO1: Provide a detailed coverage of mobile computing and communication aspects
CO2: Learn how to treat Mobile transport and network protocols
CO3: Give an exhaustive coverage to MANET and WSN
CO4: Deal with mobile application development as well as types of mobile OS

Elective: Project: SOFTWARE DEVELOPMENT

Subject Code: U2CS6PR

CO1: Train the students to develop projects effectively.
CO2: Give the students an in depth knowledge of developing structured software programming techniques.
CO3: Exposure the students to pointer programming, file based approaches and usage of language structures.
CO4: Give the students the knowledge of developing web designing applications and android based programming applications.

LAB: Android Programming

Subject Code: U2CSC6P2

CO1: Develop Mobile Application based on open source software.
CO2: Learn to use widgets in linear layout and relative layout.
CO3: Apply style and theme.
CO4: Use menu, submenu and shortcut for the menus.
CO5: Handle Dialog box, toast and status bar.
CO6: Develope app with security feature.
CO7: Use database in the App.

SBE – 5 LAB: DOTNET PROGRAMMING

Subject Code: U3CSS6P1

CO1	Design and Create windows programs in VisualBasic.NET programming language
CO2	Work with Visual Basic Forms, Toolbox Controls and Properties
CO3	Use a modern IDE to visually and programmatically create programs with GUI's
CO4	Design and implement applications using an object-oriented methodology
CO5	Use ADO.NET to store data in database and retrieve it.

SBE - 6 LAB: Node JS Programming

Subject Code: U2CSS6P2

CO1	Understand the basics of the frame work
CO2	Use MySQL to store data in a database
CO3	Create Interface to a MongoDB database and a web service
CO4	Build advanced, scalable and high performance web applications

NME – LAB: Fundamentals of Web Designing

Subject Code: U3CSN6P

CO1	Create basic web pages
CO2	Insert ordered and unordered lists within a web page.
CO3	Insert a graphic within a web page.
CO4	Create a table within a web page.
CO5	Implement a variety of hyperlinks to connect pages.
CO6	Apply CSS styles to some page elements

COURSE OUTCOME

SELF LEARNING

Microcontrollers and Embedded System Development in C

Subject Code: U1CSSL51

- This topic will motivate students to explore on their own about microcontroller programming basics and to design embedded system based applications.

INTRODUCTION TO PYTHON PROGRAMMING

Subject Code: U1CSSL52

- To develop logic for Problem Solving.
- To develop problem solving skills and their implementation through **Python (version: 2.7)**
- To understand Open Source Software.

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DEPARTMENT OF COMPUTER SCIENCE

COURSE OUTCOMES

I 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.

COURSE OUTCOME

SEMESTER III
Data Communication and Networks

Subject Code: P19CSC31

- To enhance students knowledge in learning of Networking Concepts such as the basic network architecture, digital and analog transmission and the media, types of networks, ISDN protocols, network applications, protocols and standards.

PYTHON PROGRAMMING

Subject Code: P19CSC32

CO1	Recognize and construct common programming idioms: variables, loop, branch, subroutine, and input/output.
CO2	Define and demonstrate the use of the built-in data structures 'list', 'tuple' and 'dictionary'.
CO3	Demonstrate the principles of object-oriented programming.
CO4	Search text using regular expressions and build a GUI based application.
CO5	Describe the basics of Relational databases in Python and Understand how Python can be used for networking.

PRINCIPLES OF COMPILER DESIGN

Subject Code: P19CSC33

CO1	Describe the functionality of each phase involved in compilation process.
CO2	Implement the parsing techniques for the given programming construct described in Context Free Grammar.
CO3	Understand the different representations of intermediate code.
CO4	Generate the machine code by considering all the functionalities involved in different phases of the compilation process.
CO5	Be exposed to compiler optimization.

LAB: PYTHON PROGRAMMING

Subject Code: P19CSP31

CO1	Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python
CO2	Express different Decision Making statements and Functions
CO3	Interpret Object Oriented Programming in Python
CO4	Understand and summarize different File handling operations
CO5	Understand Mutithreading and Regular expressions Concepts in Python
CO6	Explain how to design GUI Applications in Python and evaluate different database operations
CO7	Design and develop Client Server network applications using Python

Open Source Programming

Subject Code: P19CSP32

- To Demonstrate how to use the following Shell commands
- To learn tracing mechanisms, user variables, Shellvariables, read-only variables, positional parameters, reading input to Shell script, command substitution, comments, and exporting variables.
- To Write moderately complex Shell scripts

Wireless Communication

Subject Code: P19CSE31

- To introduce the concepts of wireless / mobile communication using cellular environment.
- To make the students to know about the various modulation techniques, propagation methods, coding and multi access techniques used in the mobile communication.
- Various wireless network systems and standards are to be Introduced.

Operating System Design

Subject Code: P19CSE32

- To understand the concepts, structure and mechanism of operating systems.
- To understand the design principles and implementation of windows vista operating system.

Computer Networking Security

Subject Code: P19CSE33

- To give the awareness to the students about the security in Computer networking and also it describes the study of several network attacks and Retrieving authentication by some symmetric and asymmetric key cryptography concepts as well as Digital Signature with hashing in view of analysis of security

SEMESTER IV
NEURAL NETWORKS

Subject Code: P19CSC41

CO1	Understand the learning and generalization issues in Neural Computation.
CO2	Interpret the basic ideas behind most common learning algorithms.
CO3	Implement common learning algorithms.
CO4	Describe Fuzzy Logic and Neural Networks.
CO5	Apply neural networks to classification and recognition problems.

Data Mining and Warehousing

Subject Code: P19CSC42

- Data mining and warehousing are recent technologies that enable the discovery of interesting patterns from large collection of data. Data mining emphasizes human understandability of discovered patterns and scalability of its techniques to huge stores of data such as the World Wide Web

COURSE OUTCOMES

UNDERGRADUATE

III - Year

V - Semester

Employability Skills **Subject Code: U1PS51**

In this course, the students will

CO1:	Enrich them with the employability skills like reasoning skills and aptitude skills.
CO2:	Get adequate exposure to various types of competitive examinations.
CO3:	Get enough training in OMR based answer sheet.

COURSE OUTCOMES

UNDERGRADUATE

I - Semester

Value Education **Subject Code: U1VE11**

In this course, the students will

CO1:	Learn to choose their own personal moral and spiritual values.
CO2:	Learn to become responsible citizens.
CO3:	Get sensitized to value formation.