

# **Hajee Karutha Rowther Howdia College**

**(Autonomous)**

**Uthamapalayam 625 533, Theni District.**



## **Department of Computer Science**

**Programme Specific Outcomes (PSOs)**

**Programme Outcomes (POs)**

**Course Outcomes (COs)**

# B.Sc. Computer Science

## **Programme Specific Outcomes (PSOs):**

**PS01:** Prepared to be employed in IT industries by providing expected domain knowledge.

**PS02:** Provided with practical training, hands-on and project experience to meet the industrial needs.

**PS03:** Motivated in career and entrepreneurial skill development to become global leaders.

**PS04:** Trained to demonstrate creativity, develop innovative ideas and to work in teams to accomplish a common goal.

**PS05:** Addressed with social issues and guided to operate problems with solutions.

## **Programme Outcomes (POs):**

**PO1: Professional Skills:** The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design and big data analytics for efficient design of computer-based systems of varying complexity

**PO2: Hardware Knowledge:** The ability to understand the digital logic levels, designing digital circuits, PC assembly, Troubleshooting, networking, working of central processing unit, input-output & memory organization, function of microprocessors and assembly language programs.

**PO3: Industry Ready:** Perceive technical, practical and communicative skills among the students to face the industrial needs.

**PO4: Software Engineering Practices:** The ability to apply standard practices and strategies in software service management using open-ended programming environments with ability to deliver a quality service for business success.

**PO5: Successful Career and Entrepreneurship:** The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies.

## Course Outcomes (COs):

<b>Course Code:</b> 20UCSC11	<b>Course Title:</b> Programming in C
<b>Course Outcomes (COs):</b> <b>CO1:</b> Illustrate the procedural paradigm with variables, constants, operations and I/O functions. <b>CO2:</b> Demonstrate the concept of control statements <b>CO3:</b> Know the concept of array and strings <b>CO4:</b> Expose the concept of functions and structures <b>CO5:</b> Reveal the importance of pointers and file	

<b>Course Code:</b> 20UCSC1P	<b>Course Title:</b> C & DPA Lab
<b>Course Outcomes (COs):</b> <b>CO1:</b> Understand and write programs using control statements <b>CO2:</b> Develop programs using arrays <b>CO3:</b> Handle files <b>CO4:</b> Design logic circuits <b>CO5:</b> Construct sequential circuits	

<b>Course Code:</b> 20UCSA11	<b>Course Title:</b> Digital Principles and Applications
<b>Course Outcomes (COs):</b> <b>CO1:</b> Learn and understand the various number systems and codes <b>CO2:</b> Understand and construct simple logic circuits <b>CO3:</b> Design and build converters <b>CO4:</b> Gain knowledge about binary arithmetic and design arithmetic buildingblocks <b>CO5:</b> Construct various flip flops	

<b>Course Code:</b> 20UCSC21	<b>Course Title:</b> Database Management Systems
<b>Course Outcomes (COs):</b> <b>CO1:</b> Describe the fundamental concepts of relational database management systems <b>CO2:</b> Explain the basic concepts of relational data model <b>CO3:</b> Manipulate the data using relational algebra and calculus <b>CO4:</b> Formulate SQL queries on data. <b>CO5:</b> Improve the database design by normalization.	

<b>Course Code:</b> 20UCSC2P	<b>Course Title:</b> Database Management Systems Lab
<b>Course Outcomes (COs):</b> <b>CO1:</b> Design and implement a database schema for a given problem-domain <b>CO2:</b> Create and maintain tables using SQL <b>CO3:</b> Populate and query a database <b>CO4:</b> Manipulate Set Operations on tables <b>CO5:</b> Develop Application Programs using PL/SQL	

**Course Code:** 20UCSA21

**Course Title:** Mathematical Statistics

**Course Outcomes (COs):**

**CO1:** Choose the appropriate measure and explain the measures

**CO2:** Apply the different measures to solve simple problems.

**CO3:** Find the equation of the straight line and analyze the simple linear regression equation for a given set of data and know the basic assumptions behind regression analysis.

**CO4:** Compare the association between attributes.

**CO5:** Acquire the knowledge on vital statistics, Index numbers and calculate an index from given data.

**Course Code:** 20UCSC31

**Course Title:** Object Oriented Programming with Java

**Course Outcomes (COs):**

**CO1:** Illustrate the procedural paradigm with variables, constants, and simple Java program.

**CO2:** Demonstrate Class, Methods and constructors.

**CO3:** Discuss the concept of Arrays, Inheritance and packages.

**CO4:** Know the concept of Thread, Errors & Exceptions.

**CO5:** Reveal the importance of Graphics program & Managing Input/Output files in Java.

**Course Code:** 20UCSC3P

**Course Title:** Programming in Java Lab

**Course Outcomes (COs):**

**CO1:** Understand and write programs using control statements.

**CO2:** Object oriented concept.

**CO3:** Discuss Arrays and inheritance.

**CO4:** Demonstrate Threaded Programming, Errors and Exception.

**CO5:** Construct Graphics Programming and Files.

**Course Code:** 20UCSA31

**Course Title:** Graph Theory

**Course Outcomes (COs):**

**CO1:** Explain the basic concepts in Graph Theory

**CO2:** Understand the concepts of connectedness in graph

**CO3:** Identify the various types of graphs

**CO4:** Obtain knowledge on trees and matchings

**CO5:** Acquire the concepts of planer graphs and colouring

**Course Code:** 20UCSC41

**Course Title:** Data Structures and Algorithms

**Course Outcomes (COs):**

**CO1:** Summarize the basic data structures concepts such as arrays, structures, unions, pointers, strings and dynamic memory allocation functions

**CO2:** Make use of stacks to evaluate mathematical expressions and queues for mazing problem.

**CO3:** Choose linked lists to implement of lists, stacks, queues, polynomials and sparse matrix.

**CO4:** Construct various types of trees using linked lists and apply tree traversal methods for expressions evaluation.

**CO5:** Utilize BFS, DFS, searching, sorting, hashing and files concepts to develop various applications.

**Course Code:** 20UCSC4P

**Course Title:** DS, Algorithms & Numerical Methods Lab

**Course Outcomes (COs):**

**CO1:** Create programs to sort numbers and strings sequential search and binary search.

**CO2:** Explain stack and queue data structure and their practical application.

**CO3:** Application of link list real application like dynamic storage management.

**CO4:** Develop programs for queue data structure and its operations.

**CO5:** Apply numerical methods to find solution of algebraic equations using different methods and different conditions and numerical solution of system of algebraic equations.

**Course Code:** 20UCSA41

**Course Title:** Numerical Methods

**Course Outcomes (COs):**

**CO1:** Select appropriate method for finding numerical solutions of algebraic and transcendental equations.

**CO2:** Find approximate solutions to simultaneous equation

**CO3:** Solve mathematical problems such as interpolation

**CO4:** To enable the students to solve Numerical differentiation and Numerical Integration

**CO5:** To enable the students to solve differential equation and partial differential equations numerically

# **M.Sc. Computer Science**

## **Programme Specific Outcomes (PSOs):**

**PS01:** Graduates are prepared to acquire broad knowledge of Computer Science and a focused understanding of their area of interest.

**PS02:** Graduates will gain the ability to work effectively as a team member and/or leader in dynamic professional environment

**PS03:** Graduates will be capable to take up research programmes

**PS04:** Graduates are prepared to survive in rapidly changing technology and engage in life-long learning.

**PS05:** Graduates work effectively in multi-disciplinary and multi-cultural environments by respecting professionalism and ethical practices within organization and society at national and international level.

## **Programme Outcomes (POs):**

**PO1:** Provide technology-oriented students with the knowledge and ability to develop creative solutions.

**PO2:** Develop skill to learn new technology.

**PO3:** Apply computer science theory and software development concept to construct computing-based solutions.

**PO4:** Design and develop computer programs/computer-based system in areas related to algorithms, networking, web design, cloud computing, Mobile applications.

**PO5:** Engage independent and life-long learning for continued professional development.

## Course Outcomes (COs):

**Course Code:** 20PCSC11

**Course Title:** Discrete Mathematics

**Course Outcomes (COs):**

**CO1:** Use standard notations of propositional logic. Be able to prove the two logical expressions are or are not logically equivalent.

**CO2:** Demonstrate different traversal methods for trees and graphs. Model problems in computer science using graphs and trees

**CO3:** Work in a group to construct finite state machine.

**CO4:** Discriminate, identify and prove the properties of groups and subgroups.

**CO5:** Describe Lattices and Posets and their use.

**Course Code:** 20PCSC12

**Course Title:** Data Structures and Algorithms

**Course Outcomes (COs):**

**CO1:** Define basic static and dynamic data structures and relevant standard algorithms for them: stack, queue, dynamically linked lists, trees, graphs, heap, priority queue, hash tables, sorting algorithms, min-max algorithm

**CO2:** Formulate new solutions for programming problems or improve existing code using learned algorithms and data structures

**CO3:** Evaluate algorithms and data structures in terms of time and memory complexity of basic operations

**CO4:** Demonstrate advantages and disadvantages of specific algorithms and data structures

**CO5:** Determine and demonstrate bugs in program, recognize needed basic operations with data structures

**Course Code:** 20PCSE11

**Course Title:** Advanced System Architecture

**Course Outcomes (COs):**

**CO1:** Identify with the Concept of Parallel Processing and its Computer Architecture applications

**CO2:** Define Symmetric shared-memory architectures and their performance and efficiency in advanced multiple-issue processors

**CO3:** Describe basic concept of parallel computing

**CO4:** Evaluate the organization and operation of current generation parallel computer systems, including multiprocessor and multi core systems

**CO5:** Identify the elements of modern instructions sets and their impact on processor design

**Course Code:** 20PCSE12

**Course Title:** Cryptography and Network Security

**Course Outcomes (COs):**

**CO1:** Recognize the most common type of cryptographic algorithm and Encryption Techniques.

**CO2:** Recognize the Encryption standard and Block Chipers operations.

**CO3:** Recognize the Public-Key Infrastructure and Algorithm.

**CO4:** Recognize vulnerability assessments and the weakness of using passwords for authentication and Be able to perform simple vulner ability assessments and password audits.

**CO5:** Be able to digitally sign emails and files and able to configure simple firewall architectures and Understand Virtual Private Networks.

**Course Code:** 20PCSC1P

**Course Title:** Programming in C++ and Data Structures – Lab

**Course Outcomes (COs):**

**CO1:** Understanding the friend function, overloading operator concepts

**CO2:** Demonstrate the use of different inheritance types

**CO3:** Understand the various sorting methods

**CO4:** Evaluate the concept of pointers

**CO5:** Understand the data structure algorithms

**Course Code:** 20PCSC1Q

**Course Title:** Dot Net Programming Lab

**Course Outcomes (COs):**

**CO1:** Problem solving skills-to analyze real life problem, find and develop algorithmic step to solve it.

**CO2:** Set up an programming environment in VB DOT NET.

**CO3:** Developing Tools in ASP DOT NET.

**CO4:** Experience with developing and debugging software in ASP DOT NET, C# DOT NET.

**CO5:** Configure an C# DOT NET application.

**Course Code:** 20PCSC21

**Course Title:** Advanced Java Programming

**Course Outcomes (COs):**

**CO1:** Design and Develop Swing –based GUI Components.

**CO2:** Develop Client/Server Applications using Socket Programming and Database Connectivity.

**CO3:** Develop a JSP applications and server side Servlet concept.

**CO4:** Develop distributed applications using RMI and CORBA

**CO5:** Develop and implement the android applications programs



<b>Course Code:</b> 20PCSC22	<b>Course Title:</b> Database Management System
<b>Course Outcomes (COs):</b>	
<b>CO1:</b> Describe DBMS architecture, physical and logical designs, database modeling, relational, hierarchical and network models.	
<b>CO2:</b> Understanding of normalization theory and apply such knowledge to the normalization of a database	
<b>CO3:</b> Identify database storage structures and access techniques such as file organizations, indexing methods and hashing.	
<b>CO4:</b> Understand various transaction processing, concurrency control mechanisms and database protection mechanisms.	
<b>CO5:</b> Apply the various database models, advanced database technologies and products used in enterprise	

<b>Course Code:</b> 20PCSC23	<b>Course Title:</b> Operating Systems and Principles
<b>Course Outcomes (COs):</b>	
<b>CO1:</b> Analyze the structure of OS and basic architectural involved in OS design	
<b>CO2:</b> Evaluate the requirement for process synchronization and scheduling of processes.	
<b>CO3:</b> Describe the I/O concepts and Deadlock Principles.	
<b>CO4:</b> Identify use and evaluate the storage management policies with respect to different storage management	
<b>CO5:</b> Describe the Files and File system Management	

<b>Course Code:</b> 20PCSE21	<b>Course Title:</b> Data communications and networks
<b>Course Outcomes (COs):</b>	
<b>CO1:</b> Describe the components and infrastructure that form the basis for most computer networks.	
<b>CO2:</b> Detect and correct the errors in the Data Link Layer.	
<b>CO3:</b> Implement a suitable Routing strategies for a given Network.	
<b>CO4:</b> Use suitable Transport/Application Layer Protocol based on application requirements.	
<b>CO5:</b> Examine the performance analysis for a network using tools.	

<b>Course Code:</b> 20PCSE22	<b>Course Title:</b> Data Mining
<b>Course Outcomes (COs):</b>	
<b>CO1:</b> Learn the different data mining techniques; find the recent researches in data mining and supporting technologies.	
<b>CO2:</b> Compare the input and output of different data mining algorithms	
<b>CO3:</b> Understand Methodological techniques for dealing with missing data	
<b>CO4:</b> Acquire knowledge on discovery of Association rules in Transaction Databases	
<b>CO5:</b> Understand the Partitional Clusterings like k-medoids, Modern Clustering Methods like DBSCAN	

**Course Code:** 20PCSC2P

**Course Title:** Advanced Java Programming Java Lab

**Course Outcomes (COs):**

**CO1:** Explain Java fundamentals and Object Oriented Programming (OOP) concepts and AWT Components.

**CO2:** To learn and Implement how to design GUI with Java Swing

**CO3:** Understand how to use and implement the Java Script & JSP

**CO4:** Design and implement server side programs using Socket and Servlets.

**CO5:** Experiment with database connectivity, to familiarize the advanced java programming skills and develop java based web applications.

**Course Code:** 20PCSC2Q

**Course Title:** OS and Networks Lab

**Course Outcomes (COs):**

**CO1:** Understand the basic concepts of shell programming

**CO2:** Understand the concepts of files in shell programming

**CO3:** Demonstrate the files and directories of shell programming

**CO4:** Understand and demonstrate the networking concepts

**CO5:** Evaluate and demonstrate the scheduling algorithms

**Course Code:** 20PCSC31

**Course Title:** Mobile Computing

**Course Outcomes (COs):**

**CO1:** Describe the basics Concepts and Architecture of Mobile Computing.

**CO2:** Understand the Emerging Technologies of Bluetooth, WIMAX and WAP.

**CO3:** Analyze the Network Multimedia Application Security Issues in Mobile Computing.

**CO4:** Understanding JAVA SE and the DALVIK virtual machine and Apply the Android Application Resources.

**CO5:** Apply common UI elements and Evaluate Menus in Android.

**Course Code:** 20PCSC32

**Course Title:** Compiler Design

**Course Outcomes (COs):**

**CO1:** Learn the various phases of compiler.

**CO2:** Learn the various parsing techniques.

**CO3:** Understand intermediate code generation.

**CO4:** Learn to implement front-end of the compiler.

**CO5:** Learn to implement code generator.

**Course Code:** 20PCSE31

**Course Title:** Cloud Computing

**Course Outcomes (COs):**

**CO1:** Identify the working of cloud computing concepts & develop the cloud computing environments

**CO2:** Define the principles of parallel and distributed computing, work with remote procedure call & distributed computing technologies

**CO3:** Describe the architecture of cloud, economics of the cloud

**CO4:** Understand the Paas, Iaas cloud services & work with it

**CO5:** Apply the monitoring & management in the cloud environments, impacts of SLA in using cloud services

**Course Code:** 20PCSE32

**Course Title:** Big Data Analytics

**Course Outcomes (COs):**

**CO1:** Differentiate traditional data processing with Big Data Analytics

**CO2:** Explain the technology landscape behind the Big Data Analytics using Hadoop and NoSQL

**CO3:** Solve distributed computing challenges with the help of Hadoop and MongoDB.

**CO4:** Perform CRUD operations using Cassandra and Hive

**CO5:** Differentiate between Pig and Hive in terms of processing and to design Jasper Reports using Jasper soft studio using data from NoSQL databases.

**Course Code:** 20PCSC3P

**Course Title:** Open Source Technology – Lab

**Course Outcomes (COs):**

**CO1:** Independently design and develop computer software systems and products based on sound theoretical principles and appropriate software development skills.

**CO2:** Demonstrate knowledge of technological advances through active participation in life-long

**CO3:** Accept to take up responsibilities upon employment in the areas of teaching, research, and software development.

**CO4:** Exhibit technical communication, collaboration and mentoring skills

**CO5:** Assume roles both as team members and as team leaders in an organization.

<b>Course Code:</b> 20PCSC3Q	<b>Course Title:</b> Mobile Application Development – Lab
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**Course Outcomes (COs):**

**CO1:** Develop an activity in android environment, compare & evaluate the different activities

**CO2:** Create calculator with basic arithmetic operations, add the scroll view to the display window

**CO3:** Create menus, set and reset the count-down timer, make use of list view in android environment

**CO4:** Develop simple to do list & create multiple activities, able to use radio group functionality in android environment

**CO5:** Create alerts, develop animation, make use of action button

<b>Course Code:</b> 20PCSC41	<b>Course Title:</b> Software Engineering
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**Course Outcomes (COs):**

**CO1:** Plan a software engineering process life cycle , including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements

**CO2:** Able to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project

**CO3:** Know how to develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice

**CO4:** Analyze and translate a specification into a design, and then realize that design practically, using an appropriate software engineering methodology.

**CO5:** Able to use modern engineering tools necessary for software project management, time management and Software reuse.

<b>Course Code:</b> 20PCSE41	<b>Course Title:</b> Computer Graphics and Multimedia
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**Course Outcomes (COs):**

**CO1:** Understand the basic concepts of computer graphics application and its algorithms

**CO2:** Understand the concepts of windows viewing, clipping and 2D transformations

**CO3:** Understand and demonstrate 3D transformation and hidden surfaces in transformation

**CO4:** Understand and demonstrate the multimedia, visual display systems and file formats.

**CO5:** Demonstrate the audio and video formats and its broadcasting.

**Course Code:** 20PCSE42

**Course Title:** Digital Image Processing

**Course Outcomes (COs):**

**CO1:** Understand the basic concepts and origins of digital image processing.

**CO2:** Understand the concepts of image transformation and filters used in digital processing

**CO3:** Understand and demonstrate Resampling and Reconstruction of image processing

**CO4:** Understand and demonstrate the colour processing and colour models of image

**CO5:** Demonstrate the image morphing and its algorithm