



Department of Computer Science  
Y.A. Government College for Women  
Chirala - 523155, A.P.  
Re-accredited with 'B' grade by NAAC

Email: gdcwchirala@gmail.com

<https://yagcwchirala.ac.in>



## **B.Sc., Honours in computer science MAJOR w.e.f AY 2023-24 onwards**

### **NOTICE**

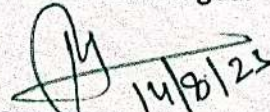
The Following are the learning outcomes, Programme specific outcomes of four year B.Sc Honours in Computer Science Major program w.e.f Academic Year 2023-24 onwards. On successful completion of the programme students are able to,

### **Program Outcomes**

- PO1: Learn the fundamentals of mathematics and computer science.
- PO2: Design simple solutions using concepts of data structure and algorithms.
- PO3: Solve problems and formulate simple solutions using mathematics and computer programming.
- PO4: Apply the concepts of software engineering to build simple projects.
- PO5: Create, select, and apply appropriate techniques using modern IT tools.
- PO6: Effectively write reports, prepare documentation and make effective presentations.
- PO7: Demonstrate knowledge and understanding of the software and management principles and apply these to one's own work.

### **Programme Specific Outcomes**

- Ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- Ability to design, implement, and evaluate a computer-based system, process, component, or program to solve the given problem.
- Ability to communicate effectively through oral and written means.
- Ability to work in a team to achieve a common goal

  
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CHIRALA-523 155  
Prakasam Dist. (A.P.)

## **Course Learning Outcomes**

### **Paper 1: Essentials and Applications of Mathematical, Physical and Chemical Sciences**

1. Apply critical thinking skills to solve complex problems involving complex numbers, trigonometric ratios, vectors, and statistical measures.
2. To explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to connect their knowledge of physics to everyday situations.
3. To explain the basic principles and concepts underlying a broad range of fundamental areas of chemistry and to connect their knowledge of chemistry to daily life.
4. Understand the interplay and connections between mathematics, physics, and chemistry in various applications. Recognize how mathematical models and physical and chemical.

### **Paper 2: Advances in Mathematical, Physical and Chemical Sciences**

1. Explore the applications of mathematics in various fields of physics and chemistry, to understand how mathematical concepts are used to model and solve real-world problems.
2. To explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to connect their knowledge of physics to everyday situations.
3. Understand the different sources of renewable energy and their generation processes and advances in nano-materials and their properties, with a focus on quantum dots.
4. To gain an understanding of the principles of biophysics in studying biological systems. Explore the properties and applications of shape memory materials.

### **Paper 3: Problem Solving using C**

1. Understand the working of a digital computer and Fundamental constructs of Programming
2. Analyse and develop a solution to a given problem with suitable control structures
3. Apply the derived data types in program solutions
4. Use the 'C' language constructs in the right way.
5. Apply the Dynamic Memory Management for effective memory utilization

### **Paper 4: Digital Logic Design**

1. Understand how to Convert numbers from one radix to another radix and perform arithmetic operations.
2. Simplify Boolean functions using Boolean algebra and k- maps
3. Design adders and sub tractors circuits.
4. Design combinational logic circuits such as decoders, encoders, multiplexers and DE multiplexers.
5. Use flip flops to design registers and counters

## **Paper 5:: Object Oriented Programming using Java**

1. Understand the basic concepts of Object-Oriented Programming and Java Program Constructs
2. Implement classes and objects and analyse Inheritance and Dynamic Method Dispatch
3. Demonstrate various classes in different packages and can design own packages
4. Manage Exceptions and Apply Threads
5. Create GUI screens along with event handling

## **Paper 6: Data Structures using C**

1. Understand various Data Structures for data storage and processing.
2. Realize Linked List Data Structure for various operations
3. Analyze step by step and develop algorithms to solve real world problems by implementing Stacks, Queues data structures.
4. Understand and implement various searching & sorting techniques.
5. Understand the Non-Linear Data Structures such as Binary Trees and Graphs

## **Paper 7: Computer Organization**

1. Identify different types of instructions
2. Differentiate between micro-programmed and hard-wired control units.
3. Analyse the performance of hierarchical organization of memory.
4. Summarize different data transfer techniques.
5. Demonstrate arithmetic operations on fixed- and floating-point numbers and illustrate concepts of parallel processing.

## **Paper 8: Operating Systems**

1. Demonstrate knowledge and comprehension of operating system functions.
2. Analyse different process scheduling algorithms and apply them to manage processes and threads effectively
3. Create strategies to prevent, detect, and recover from deadlocks, and design solutions for inter-process communication and synchronization problems.
4. Compare and contrast different memory allocation strategies and evaluate their effectiveness
5. Evaluate disk scheduling algorithms while implementing OS security measures

## **Paper 9: Database Management Systems**

1. Differentiate between database systems and file based systems
2. Design a database using ER model
3. Use relational model in database design
4. Use SQL commands for creating and manipulating data stored in databases.
5. Write PL/SQL programs to work with databases.

### **Paper 10: Object Oriented Software Engineering**

1. Understand and apply the fundamental principles of Object-Oriented Programming (OOP) concepts and Unified Modelling Language (UML) basics, in the development of software solutions.
2. Analyse and specify software requirements, develop use cases and scenarios, apply object-oriented analysis and design (OOAD) principles
3. Familiar with the concept of test-driven development (TDD) and its practical implementation.
4. Analyse and Evaluate Software Maintenance and Evolution Strategies
5. Apply Advanced Object-Oriented Software Engineering Concepts

### **Paper 11: Data Communication and Computer Networks**

1. Understand and apply network applications, hardware, software, and reference models for network communication.
2. Design and analyse data link layer protocols, multiple access protocols, and wireless LAN technologies.
3. Design routing algorithms, congestion control algorithms, and evaluate network layer protocols for internetworking.
4. Analyse transport service, transport protocols, and evaluate UDP and TCP in the internet.
5. Understand and evaluate application layer protocols, including DNS, email, WWW, and network management protocols.

### **Paper 12: Web Interface Designing Technologies**

1. Understand and appreciate the web architecture and services along with its basic building blocks.
2. Gain knowledge about various components of a website related to aesthetics.
3. Demonstrate skills regarding creation of a static website and addition of dynamic behaviour to a website.
4. Get experience on making user-interactive web pages.
5. Learn how to install word press and gain the knowledge of installing various plugins to use in their websites.

### **Paper 13: Web Applications Development using PHP & MYSQL**

1. Write simple programs in PHP.
2. Understand how to use regular expressions, handle exceptions, and validate data using PHP.
3. Apply In-Built functions and Create User defined functions in PHP programming.
4. Write PHP scripts to handle HTML forms.
5. Know how to use PHP with a MySQL database and can write database driven web pages.

### **Paper 14 A: Internet of Things**

1. Understand various concepts, terminologies and applications of IoT
2. Learn how to build IoT devices with development boards.
3. Understand various Wireless protocols for IoT.
4. Learn how to use various sensors and actuators & develop IoT solutions using Arduino.
5. Develop and Connect IoT with Cloud Platforms.

### **Paper 14 B: Foundations of Data Science**

1. Identify the need for data science and understand various data collection strategies.
2. Understand about NoSQL and Descriptive Statistics
3. Apply Number methods to process the data in an array.
4. Summarize and Compute Descriptive Statistics using Pandas.
5. Apply powerful data manipulations visualization using Pandas

### **Paper 15 A: IoT Applications Development and Programming**

1. Understand the Basic Concepts of Internet of Things
2. Learn various Sensors and their associative protocols
3. Learn the Single Board Computers for development of IoT
4. Build the IoT devices with the Node-RED without Complex coding
5. Develop various IoT real-time applications

### **Paper 15 B: Application Development using Python**

1. Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
2. Demonstrate proficiency in handling Strings and File Systems.
3. Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
4. Interpret the concepts of Web Programming and GUI in Python
5. Apply concepts of Python programming in various fields related to IOT, Web Services and Databases in Python.

### **Paper 16 A: Advanced Data Structures**

1. Apply appropriate hashing techniques for a given problem.
2. Simulate the operations of Heap trees.
3. Provide solutions using multi-way search trees.
4. Choose appropriate algorithm while establishing a network.
5. Apply the knowledge of disjoint sets for solving a given problem

### **Paper 16 B: Artificial Intelligence**

1. Analyze AI problems and search techniques using underlying assumptions and AI techniques.
2. Apply heuristic search techniques for problem-solving and optimization.
3. Understand knowledge representation approaches and apply predicate logic for representing facts and relationships.
4. Utilize rule-based systems for representing knowledge and apply reasoning techniques for problem-solving.
5. Implement symbolic reasoning under uncertainty and augment problem-solving strategies with non-monotonic reasoning.

### **Paper 17 A: Computer Graphics**

1. Understand computer graphics fundamentals
2. Perform 2D and 3D
3. Apply window-to-view port transformation and perform line and polygon clipping operations.
4. Determine visible surfaces and apply computer graphics algorithms for depth comparison, back-face removal, and rendering.
5. Apply animation principles, work with Flash interface, and gain an introduction to virtual reality.

### **Paper 17 B: Design and Analysis of Algorithms**

1. Understand the fundamental concepts of algorithm analysis and design techniques.
2. Apply divide and conquer design techniques for solving problems
3. Analyse the performance of given problem using greedy approach.
4. Analyse the given problem and provide the feasible solution using dynamic programming.
5. Analyse the complexity of a given problem.

### **Paper 18 A: Principles of Machine Learning**

1. Understand the features of machine learning to apply on real world problems.
2. Characterize the machine learning algorithms as supervised learning and unsupervised learning, apply and analyse the various algorithms of supervised and unsupervised learning.
3. Analyse the concept of neural networks for learning linear and non-linear activation functions.
4. Identify an appropriate clustering technique to solve real world problems.

5. Choose a suitable machine learning model, implement and examine the performance of the chosen model for a given real world problems

### **Paper 18 B: Software Testing**

1. Understand software testing principles and apply effective test case design strategies.
2. Implement and execute different levels of testing
3. Utilize Selenium for automation testing, including handling web elements and utilizing advanced features.
4. Implement and leverage automation testing frameworks for efficient test automation.
5. Apply Testing framework for advanced test execution, management, and parallel processing.

### **Paper 19 A: Advanced Java Programming**

1. Understand the multi-tier architecture of J2EE and its implementation in enterprise applications.
2. Develop web applications using Java Servlets and establish database connectivity with JDBC.
3. Create dynamic and interactive web pages using Java Server Pages (JSP) and implements with beans and custom tag libraries.
4. Build enterprise applications using Enterprise Java Beans (EJB) and understand their deployment and configuration.

### **Paper 19 B: MEAN Stack Development**

1. Gain a comprehensive understanding of web development frameworks, JavaScript fundamentals, and DOM manipulation.
2. Develop proficiency in creating Node.js applications, handling data I/O operations, and utilizing events and callbacks.
3. Build RESTful services using Node.js and Express framework, mastering HTTP handling and routing.
4. Acquire knowledge and skills in working with MongoDB, performing CRUD operations, and utilizing Mongoose for database integration.

### **Paper 20 A: Mobile Application Development**

1. Gain a solid understanding of mobile application development principles
2. Develop proficiency in setting up the Android development environment
3. Acquire the necessary skills to handle and manage Android resources effectively
4. Develop expertise in designing user interfaces by utilizing a wide range of UI widgets
5. Learn various storage techniques in Android and Understand how to integrate web applications

### **Paper 20 B: R Programming**

1. Gain a solid understanding of R programming language
2. Acquire knowledge and skills in manipulating matrices, lists, and data frames, including performing operations and applying functions.
3. Develop the ability to create user-defined functions, handle variable scope, and perform exploratory data analysis, including data pre-processing and descriptive statistics.
4. Learn various data visualization techniques in R, including basic and advanced visualizations, as well as creating 3D plots.

### **Paper 21 A: Big Data Technologies**

1. Understand the importance and challenges of Big Data, including its classification and applications.
2. Familiarize with Apache Hadoop and learn data movement and Map Reduce algorithms.
3. Explore Hadoop architecture, including HDFS, MapReduce tasks, and cluster setup.
4. Develop skills in Hive and HiveQL for querying and analyzing data in Hadoop.
5. Gain proficiency in HBase, including schema design, advanced indexing, and working with Zookeeper for cluster monitoring.

### **Paper 21 B: Compiler Design**

1. Understand the compiler structure and the process of lexical analysis using finite automata.
2. Acquire knowledge of syntax analysis techniques, including recursive descent parsing, predictive parsing, and LR parsing.
3. Learn about syntax-directed translation, intermediate code generation, and error detection and recovery methods in compilers.
4. Explore storage organization, dynamic storage allocation, error recovery methods, and code generation issues in compilers.
5. Develop an understanding of code optimization techniques, machine-dependent optimization, register allocation, and machine-independent optimization in compilers.

### **Paper 22 A: Data Mining Concepts and Techniques**

1. Understand data warehousing concepts, including data warehouse architecture, multidimensional data models, and OLAP operations.
2. Explore the fundamentals of data mining, including its definition, techniques, and applications in real-world scenarios.
3. Develop knowledge and skills in clustering techniques, including partitioning algorithms, hierarchical clustering, and categorical clustering.
4. Acquire proficiency in decision tree construction and the use of decision tree algorithms for data analysis and prediction.

### **Paper 22 B: Digital Image Processing**

1. Understand digital image processing fundamentals and applications in various domains.
2. Develop skills in spatial domain image enhancement techniques
3. Acquire proficiency in frequency domain image enhancement
4. Master in image segmentation techniques
5. Learn image compression principles.

### **Paper 23 A: Information Security and Cryptography**

1. Demonstrate the knowledge of cryptography, network security concepts and applications.
2. Develop security mechanisms to protect computer systems and networks.
3. Apply security principles in system design.
4. Apply methods for authentication, access control, intrusion detection and prevention

### **Paper 23 B: Mobile Ad hoc and Sensor Networks**

1. Understand the concept of ad-hoc and sensor networks, their applications and typical node and network architectures.
2. Describe the MAC protocol issues of ad hoc networks.
3. Identify and describe routing protocols for ad hoc wireless networks with respect to TCP design issues.
4. Explain the concepts of network architecture and MAC layer protocol for WSN.
5. Familiar with the OS used in Wireless Sensor Networks and build basic modules

### **Paper 24 A: Advanced Database Management Systems**

1. Gain understanding of relational database concepts, functional dependencies, and correctness of FDs.
2. Analyze and apply normalization techniques (3NF, BCNF, 4NF, 5NF)
3. Develop skills in processing joins, grasp materialized vs. pipelined processing
4. Learn principles of correct interleaved execution, locking mechanisms (2PL), handle deadlocks.
5. Acquire knowledge of T/O-based techniques, multi-version approaches

### **Paper 24 B: Cloud Computing**

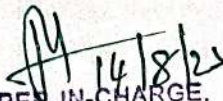
1. Understand the essential characteristics and benefits of cloud computing
2. Gain knowledge of virtualization technologies
3. Explore Microsoft implementation of virtualization and understand different cloud deployment models and their advantages.
4. Learn about Infrastructure as a Service (IaaS) and Platform as a Service (PaaS) models,
5. Explore Software as a Service (SaaS) and its service providers.

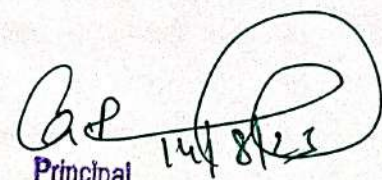
### **Paper 25 A: Computer Vision**

1. Understand the fundamental concepts of computer vision and its applications in various domains.
2. Apply color and geometric transforms, edge-detection techniques, filtering, and mathematical operations to analyse images.
3. Comprehend the concept of motion estimation and its applications.
4. Apply shape correspondence, shape matching, principal component analysis, and shape priors for object recognition.
5. Explore various applications of computer vision

### **Paper 25 B: Digital Forensics**

1. Gain a clear understanding of the fundamentals of digital forensics
2. Develop knowledge and skills in analyzing storage media and file systems
3. Learn about network forensics and acquire practical skills in network packet sniffing, analysis using tools like Wireshark and TCPDUMP
4. Gain expertise in logs and event analysis, data carving
5. Develop proficiency in wireless and web attacks.

  
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AY 2023-24

**Declaration by Students About P.Os/P.S.Os/C.Os**

This is to Certify that the program Outcomes, Program Specific Outcomes and Courses Outcomes of B.sc Program with MDCs group , Computer Science as one of the core courses are explained to me. I have joined this course after knowing / getting awareness on the learning Outcomes of this course only

Sl.No.	NAME OF THE STUDENT	MOBILE NO.	GROUP	Signature of Student
1	POTLURI NAVEENA	8106366880	B Sc Honours	P. Naveena
2	KATTA RAMYA	8519948677	B Sc Honours	K. Ramya
3	CHALLA PRAMODHINI	9133163422	B Sc Honours	CH. PRAMODHINI
4	JONNALAGADDA LEKHANA	9985042199	B Sc Honours	J. Lekhana
5	ONGOLE WINCY SATWIKA	9849929676	B Sc Honours	O. Satwika
6	GADDE SIREESHA	9908942353	B Sc Honours	G. Sireesha
7	KONDAPATURI LEKHANA	9640933038	B Sc Honours	K. Lekhana
8	NARAGA SUSHMAS	9581829012	B Sc Honours	N. Sushmas
9	DUDDU HASINI	7780535632	B Sc Honours	D. Hasini
10	ANNAM PRAMEELA	9573731177	B Sc Honours	A. Prameela
11	MUNNAM ANUSHA	8121102392	B Sc Honours	M. Anusha
12	KUKKALA VENKATA VYSHNAVI	8142822797	B Sc Honours	K. Vyshnavi
13	GANGAVARAPU SNEHALATHA	8341657516	B Sc Honours	G. Snehalatha
14	PINJALA DEVI PRIYA	8885191610	B Sc Honours	P. Devi Priya
15	BANDI CHANDRIKA	7993667061	B Sc Honours	B. Chandrika
16	DAMARLA CHANDRA LEKHA	9948518622	B Sc Honours	D. Chandra Lekha
17	SHAIK SONI SULTHAN	9666539750	B Sc Honours	SK. Soni Sulthan
18	GUNTURU PRAVEENA	7095394956	B Sc Honours	G. Praveena
19	SANADI MOUNIKA	7093475112	B Sc Honours	S. Mounika
20	SHAIK RIZWANA	9392617575	B Sc Honours	SK. Rizwana
21	MEKALA SANGEETHA PRIYADARSHINI	9030097610	B Sc Honours	M. Sangeetha
22	PALETI NAVYASRI	8142175358	B Sc Honours	P. Navya Sri
23	SK RABEENA	6300114858	B Sc Honours	SK. Rabeena
24	MUNNAM VISHNU PRIYA	8121209724	B Sc Honours	M. Vishnu Priya
25	KATABATTUNI ROHINI	9154232193	B Sc Honours	K. Rohini
26	MUKIRI GLORY	8374178221	B Sc Honours	M. Glory
27	DAGGUMALLI DEDEEPIYA	8106297171	B Sc Honours	D. Dedeepya

*[Signature]*  
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