

Session: 2026-27 (ODD)

Programme: B.Tech. Computer Science & Engineering (DS)

III SEM.

Course Name (Course Code): Data Structures and Algorithms (CDUL301)

CO	Course Outcomes
CDUL301.1	Explain the concept of asymptotic principles for estimating the time complexity of various algorithms.
CDUL301.2	Describe stack and queue with their applications.
CDUL301.3	Apply operations of linked list to solve computational problems.
CDUL301.4	Analyze non-linear data structure algorithms for solving real life problems like shortest path and MST.
CDUL301.5	Compute the efficiency of the principal algorithms for sorting, searching, and hashing.

Course Name (Course Code): Statistics and Probability Theory (MAUL301)

CO	Course Outcomes
MAUL301.1	Understand the basic concepts of Probability, Baye's Law, Bernoulli's trial.
MAUL301.2	Determine probability distributions, expectations, moments, MGF, mean and variances of the discrete and continuous random variables
MAUL301.3	Illustrate different probability distributions like Binomial, Poisson, Normal, Uniform, Exponential Distribution
MAUL301.4	Compute the correlation, regression and best fit curves
MAUL301.5	Apply the concepts of Queuing theory and Markov chain

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Course Name (Course Code): Foundation of Data science (CDUL302)

CO	Course Outcomes
CDUL302.1	Discuss the fundamental concepts of data science.
CDUL302.2	Describe data source and collection management.
CDUL302.3	Apply Data analysis and algorithms for applications handling large data.
CDUL302.4	Use various visualization techniques to represent different data types.
CDUL302.5	Outline emerging trends in data analysis techniques and application development methods.

Course Name (Course Code): Technical Communication (HSUL302)

CO	Course Outcomes
HSUL302.1	Recall the meaning and characteristics of technical communication.
HSUL302.2	Understand the various techniques for reading technical texts
HSUL302.3	Demonstrate the correct usage of advanced grammar
HSUL302.4	Produce cohesive Letters, E-mails, MOM and Resume
HSUL302.5	Produce Technical Reports and Proposals in proper format

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Course Name (Course Code): Software Engineering and Project Management (CDUL303)

CO	Course Outcomes
CDUL303.1	Understand the various software development life cycle models and their characteristics
CDUL303.2	Apply requirement elicitation, analysis techniques, and formal specification methods.
CDUL303.3	Illustrate basic UML diagrams to represent software architecture and design.
CDUL303.4	Classify different software testing techniques and various tools for defect detection.
CDUL303.5	Evaluate various software project estimation methods, risk management strategies, and quality assurance practices.

Course Name (Course Code): Digital Electronics (CDUL304)

CO	Course Outcomes
CDUL304.1	Describe the structure of various number systems and codes.
CDUL304.2	Explain the basic logic gates, Boolean algebra and derive digital logic circuits.
CDUL304.3	Apply various boolean expression minimization techniques to obtain optimum logic circuit design.
CDUL304.4	Analyze the design of various combinational circuits and sequential circuits.
CDUL304.5	Compare characteristics of various logic families and calculate their parameters.

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Course Name (Course Code): Design and Analysis of Algorithms (CDUL-501)

CO	Outcomes
CDUL-501.1	Apply divide and conquer, greedy method and dynamic programming techniques to solve diverse engineering challenges.
CDUL-501.2	Apply Branch and Bound, and pattern-matching algorithms to solve complex problems
CDUL-501.3	Examine randomized and assignment problems for real-time applications.
CDUL-501.4	Categorize problems into the P, NP, NP-Complete, and NP-Hard classes for specific problems.
CDUL-501.5	Analyze the time complexity of various algorithms using asymptotic notations.

Course Name (Course Code): Machine Learning CDUL502

CO	Course Outcomes
CDUL502.1	Explain the fundamentals of Machine Learning, data preprocessing techniques, and their real-world applications.
CDUL502.2	Apply supervised learning algorithms for regression and classification, and evaluate performance.
CDUL502.3	Implement unsupervised learning, clustering, and association rule mining techniques for knowledge discovery.
CDUL502.4	Employ feature selection methods and appropriate evaluation metrics to enhance the predictive performance of machine learning models.
CDUL502.5	Analyze feature engineering, dimensionality reduction, and recommendation systems to build efficient machine learning solutions.

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Course Name (Course Code): Automata Theory and Compiler Design (CDUL503)

CO	Course Outcomes
CDUL503.1	Describe the concepts of formal languages, finite automata, regular expressions, major phases of compilers and lexical analysis
CDUL503.2	Illustrate different types of parser designs based on Context-Free Grammar (CFG).
CDUL503.3	Apply Syntax-Directed Definitions (SDDs), syntax trees, and Directed Acyclic Graphs (DAGs) to generate intermediate code and three-address code representations.
CDUL503.4	Classify various storage allocation strategies and data structures used in symbol tables.
CDUL503.5	Analyze various optimization techniques using Control Flow Graphs (CFGs) for generating efficient machine code from source code written in a high-level language.

Course Name (Course Code): Artificial Intelligence (CDUL504)

CO	Course Outcomes
CDUL504.1	Understand fundamental concepts of AI with intelligent agents and environments.
CDUL504.2	Understand different applications of AI such as NLP, computer vision, Robotics etc.
CDUL504.3	Apply various uninformed and informed search techniques to solve well-defined problems.
CDUL504.4	Analyze different knowledge representation methods and reasoning approaches including propositional and predicate logic.
CDUL504.5	Compare various machine learning paradigms including deep learning and neural networks.

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Course Name (Course Code): Cryptography and Network Security (CDUL512)

CO	Course Outcomes
CDUL512.1	Understand Security Principles, Attacks, Services and basic cryptographic techniques
CDUL512.2	Apply different Encryption approaches in Modern Block Cipher based Cryptosystems
CDUL512.3	Analyze Authentication secure communication protocols. and their functional components with underlying mathematical principles
CDUL512.4	Examine transport-level and wireless security protocols used in modern communication networks.
CDUL512.5	Evaluate wireless network security and intrusion detection techniques.

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VII SEM.

Course Name (Course Code): 7CDS4-01: DATA VISUALIZATION AND EXPLORATION WITH R

CO	Course Outcomes
7CDS4-01.1	Explain the fundamentals of data visualization, data preparation, and various graphical techniques for representing data using R.
7CDS4-01.2	Apply R language constructs, data structures, and plotting techniques to create basic graphs, plots, and maps.
7CDS4-01.3	Analyze data using ggplot2 by employing aesthetic mappings, geometric objects, statistical transformations, themes, and annotations for effective visualization.
7CDS4-01.4	Evaluate datasets through exploratory data analysis by identifying patterns, handling missing values, measuring statistical properties, and interpreting relationships among variables using R.
7CDS4-01.5	Design statistical models and professional analytical reports using regression, clustering techniques, and R Markdown for data-driven decision making.

Course Name (Course Code): Environmental Engineering and Disaster Management (7AG6-60.2)

CO	Course Outcomes
7AG6-60.2.1	Demonstrate knowledge of water supply systems by calculating domestic water requirements and selecting suitable sources, intake structures, and conveyance methods for urban and rural areas
7AG6-60.2.2	Examine drinking water quality parameters with reference to Indian Standards and differentiate suitable treatment methods to ensure safe drinking water and sanitation
7AG6-60.2.3	Implement principles of wastewater engineering to determine wastewater quantity, illustrate its characteristics, and choose suitable disposal methods in urban and rural contexts
7AG6-60.2.4	Investigate sewer system requirements, wastewater characteristics, solid waste disposal methods, and air pollution parameters, and test compliance with BIS standards for treatment and abatement.
7AG6-60.2.5	Classify types of disasters, interpret their impacts, and analyze disaster management principles to formulate effective mitigation and preparedness strategies.

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III SEM.

Course Name (Course Code): SODECA (CDUA300)

CO	Course Outcomes
CDUA300.1	Understand the importance of adhering to institutional rules and norms, showcasing respectful and disciplined behaviour in their academic interactions.
CDUA300.2	Demonstrate the ability to leverage technology platforms while integrating technical expertise with project management, effectively balancing technical and resource needs in organizing projects.
CDUA300.3	Analyze practical skills in organizing and participating in cultural and sports events by planning, coordinating, and executing various activities, demonstrating leadership and improving their problem-solving abilities.
CDUA300.4	Develop a sense of responsibility toward community service and actively engage in social outreach programs, contributing positively to societal needs.
CDUA300.5	Build the ability to engage in independent and lifelong learning by continuously acquiring new knowledge, adapting to emerging technologies, and enhancing professional skills to address evolving challenges in the field of technology.

Course Name (Course Code): Data Structures and Algorithms Lab (CDUP320)

CO	Course Outcomes
CDUP320.1	Implement basic data structures including Arrays and Link lists
CDUP320.2	Apply Stack and Queue to solve computational problems
CDUP320.3	Apply searching and sorting techniques to develop efficient solution for computational problems.
CDUP320.4	Analyze various tree traversal techniques and related operations.
CDUP320.5	Analyze graph traversals methods and shortest path algorithms.

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Course Name (Course Code): Programming in Java Lab (CDUP-321)

CO	Course Outcomes
CDUP321.1	Describe object-oriented concepts, java program structure and its installation.
CDUP321.2	Demonstrate Object oriented constructs such as various class hierarchies, interfaces and Packages.
CDUP321.3	Apply String handling technique using String &StringBuffer classes
CDUP321.4	Implement an application involving Thread and Exception handling.
CDUP321.5	Evaluate file handling mechanism for Java applications

Course Name (Course Code): Python for Data Science Lab (CDUP322)

CO	Course Outcomes
CDUP322.1	Understand the fundamental features of Python data science libraries.
CDUP322.2	Apply array manipulation and Data Frame operations for data analysis.
CDUP322.3	Analyze datasets using statistical and plotting functions.
CDUP322.4	Evaluate preprocessing of datasets for advanced analysis including geographic and temporal visualization.
CDUP322.5	Develop predictive models using regression and forecasting techniques for data-driven decision making.

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Course Name (Course Code): Digital Electronics Lab (CDUP323)

CO	Course Outcomes
CDUP323.1	Implement basic logic gates using universal gates on a breadboard.
CDUP323.2	Simulate the functionality of digital circuits using VHDL.
CDUP323.3	Analyze various combinational logic circuits (e.g., adders, multiplexers, parity generators) based on boolean expressions in SOP/POS form.
CDUP323.4	Test the sequential circuits (e.g., flip-flops, counters, shift registers) using the logic gate ICs.
CDUP323.5	Create advanced digital systems such as ALU, VHDL-based logic circuits, and mini projects by integrating combinational and sequential building blocks.

Course Name (Course Code): Industrial Training (CDUT-330)

CO	Course Outcomes
CDUT330.1	Interpret fundamental project requirement analysis and make comprehensive use of acquired technical knowledge during the training, to understand industrial processes.
CDUT330.2	Apply theoretical knowledge acquired in academic courses to solve practical problems encountered in real - world scenarios.
CDUT330.3	Demonstrate professional ethics, teamwork, communication, and continuous learning behaviour in the work environment through a compelling presentation that effectively conveys complex information.
CDUT330.4	Analyze user requirements, data flow, or system performance to identify and propose possible improvements.
CDUT330.5	Develop software modules or tools using modern technologies and development platforms, while synthesizing findings into a comprehensive, well-structured report.

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Course Name (Course Code): SODECA (CDUA500)

CO	Course Outcomes
CDUA500.1	Understand the importance of adhering to institutional rules and norms, showcasing respectful and disciplined behaviour in their academic interactions.
CDUA500.2	Demonstrate the ability to leverage technology platforms while integrating technical expertise with project management, effectively balancing technical and resource needs in organizing projects.
CDUA500.3	Analyze practical skills in organizing and participating in cultural and sports events by planning, coordinating, and executing various activities, demonstrating leadership and improving their problem-solving abilities.
CDUA500.4	Develop a sense of responsibility toward community service and actively engage in social outreach programs, contributing positively to societal needs.
CDUA500.5	Build the ability to engage in independent and lifelong learning by continuously acquiring new knowledge, adapting to emerging technologies, and enhancing professional skills to address evolving challenges in the field of technology.

Course Name (Course Code): DAA Lab (CDUP-520)

CO	Course Outcomes
CDUP-520.1	Demonstrate graph traversal techniques and Branch and Bound methods to explore solution spaces.
CDUP-520.2	Illustrate divide-and-conquer techniques to solve computational problems on various competitive coding platforms.
CDUP-520.3	Examine Greedy algorithms to develop optimal solutions for optimization problems on various competitive coding platforms.
CDUP-520.4	Analyze Dynamic Programming to solve multi-stage decision problems on various competitive coding platforms efficiently.

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CDUP-520.5	Analyze the performance of various string pattern matching algorithms.
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Course Name (Course Code): Machine Learning Lab (CDUP521)

CO	Course Outcomes
CDUP521.1	Implement appropriate data preprocessing techniques and supervised machine learning algorithms for solving classification and regression problems using standard datasets.
CDUP521.2	Examine supervised machine learning algorithms including Regression, k-Nearest Neighbors, Naïve Bayes, Support Vector Machine, Decision Tree, and Random Forest for solving classification and prediction problems.
CDUP521.3	Compare unsupervised learning techniques including clustering, dimensionality reduction and association rule mining to discover hidden patterns from datasets.
CDUP521.4	Analyze and evaluate machine learning models using feature engineering, model validation techniques and performance metrics to improve prediction accuracy.
CDUP521.5	Design machine learning-based solutions for real-world engineering applications.

Course Name (Course Code): Compiler Design Lab (CDUP522)

CO	Course Outcomes
CDUP-22.1	Apply various functions of lexical analyzer.
CDUP-22.2	Demonstrate the use of lex tool to identify patterns, tokens, and regular expressions for lexical analysis
CDUP-22.3	Analyze symbol table management techniques for inserting, deleting, and displaying symbol table entries.
CDUP-22.4	Assess the implementation of YACC programs to recognize complex string patterns.

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CDUP-22.5	<i>Assess</i> the implementation of YACC programs to compute arithmetic expressions
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Course Name (Course Code): Programming for Problem Solving-I (CDUP523)

CO	Course Outcomes
CDUP523.1	Apply programming fundamentals, arrays, strings, and recursion to solve computational problems efficiently.
CDUP523.2	Use linear data structures such as linked lists, stacks, and queues to solve real-world programming problems.
CDUP523.3	Illustrate the process of efficient algorithm design using searching, sorting, hashing, trees, and heap-based data structures.
CDUP523.4	Recommend algorithms by considering paradigms like recursion, backtracking, greedy methods, and graph traversal techniques (BFS/DFS) to solve complex programming problems.
CDUP523.5	Develop programming solutions using programming fundamentals, arrays, strings, and recursion for efficient problem solving.

Course Name (Course Code): Industrial Training (CDUT530)

CO	Course Outcomes
CDUT530.1	Interpret fundamental project requirement analysis and make comprehensive use of acquired technical knowledge during the training, to understand industrial processes.
CDUT530.2	Apply theoretical knowledge acquired in academic courses to solve practical problems encountered in real - world scenarios.
CDUT530.3	Demonstrate professional ethics, teamwork, communication, and continuous learning behaviour in the work environment through a compelling presentation that effectively conveys complex information.

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CDUT530.4	Analyze user requirements, data flow, or system performance to identify and propose possible improvements.
CDUT530.5	Develop software modules or tools using modern technologies and development platforms, while synthesizing findings into a comprehensive, well-structured report.

VII SEM.

Course Name (Course Code): SODECA (7CDS8-00)

CO	Course Outcomes
7CDS8-01	Understand the importance of adhering to institutional rules and norms, showcasing respectful and disciplined behaviour in their academic interactions.
7CDS8-02	Demonstrate the ability to leverage technology platforms while integrating technical expertise with project management, effectively balancing technical and resource needs in organizing projects.
7CDS8-03	Analyze practical skills in organizing and participating in cultural and sports events by planning, coordinating, and executing various activities, demonstrating leadership and improving their problem-solving abilities.
7CDS8-04	Develop a sense of responsibility toward community service and actively engage in social outreach programs, contributing positively to societal needs.
7CDS8-05	Build the ability to engage in independent and lifelong learning by continuously acquiring new knowledge, adapting to emerging technologies, and enhancing professional skills to address evolving challenges in the field of technology.

Course Name (Course Code): 7CDS4-21: Internet of Things Lab

CO	Course Outcomes
7CDS4-21.1	Identify the features of various data visualization tools, R/Python, and Tableau used for data visualization.
7CDS4-21.2	Explain the process of creating basic visualizations in R/Python and connecting data sources in Tableau.

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7CDS4-21.3	Apply data preparation, aggregation, and statistical functions in Tableau to organize and analyze data.
7CDS4-21.4	Analyze datasets by creating appropriate visualizations in Tableau to interpret patterns and trends.
7CDS4-21.5	Design interactive dashboards in Tableau for effective presentation of insights and decision support.

Course Name (Course Code): Social Media Analytics Lab (7CDS4-22)

CO	Course Outcomes
7CDS4-22.1	Explain various text preprocessing techniques such as stopword elimination, stemming, lemmatization, POS tagging, and lexical analysis using NLTK in Python to prepare raw textual data for analysis.
7CDS4-22.2	Implement customer reviews using sentiment analysis techniques to identify patterns and classify sentiments (positive, negative, or neutral) for product insights and customer feedback.
7CDS4-22.3	Apply web usage data, including web server logs and click stream analysis, for user behavior and improve website performance.
7CDS4-22.4	Analyze search engine optimization techniques like spamdexing for SEO strategies.
7CDS4-22.5	Evaluate website performance by utilizing Google Analytics tools to measure conversion rates, analyze visitor profiles, and traffic sources for improved decision making in marketing strategies.

Course Name (Course Code): Industrial Training (7CDS7-30)

CO	Course Outcomes
7CDS7-30.1	Interpret fundamental project requirement analysis and make comprehensive use of acquired technical knowledge during the training, to understand industrial processes.

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7CDS7-30.2	Apply theoretical knowledge acquired in academic courses to solve practical problems encountered in real - world scenarios.
7CDS7-30.3	Demonstrate professional ethics, teamwork, communication, and continuous learning behaviour in the work environment through a compelling presentation that effectively conveys complex information.
7CDS7-30.4	Analyze user requirements, data flow, or system performance to identify and propose possible improvements.
7CDS7-30.5	Develop software modules or tools using modern technologies and development platforms, while synthesizing findings into a comprehensive, well-structured report.

Course Name (Course Code): Seminar Lab (7CDS7-40)

CO	Course Outcomes
7CDS7-40.1	Identify the topic in an emerging area and the relevant background literature.
7CDS7-40.2	Analyze research papers and technical information to identify key concepts, methodologies, and recent developments in the chosen domain.
7CDS7-40.3	Evaluate the significance, limitations, and future scope of the selected technology based on critical analysis of the literature.
7CDS7-40.4	Design an effective technical seminar using appropriate presentation techniques.
7CDS7-40.5	Prepare a well-structured technical seminar report and presentation by organizing and synthesizing information from authentic sources.