



DWARAKA DOSS GOVERDHAN DOSS VAISHNAV COLLEGE

(AUTONOMOUS)

Re-accredited with "A++" by NAAC

College with Potential for Excellence, Linguistic Minority Institution

Affiliated to University of Madras

Arumbakkam, Chennai – 600 106

M.Sc. Computer Science

PROGRAM SPECIFIC OUTCOMES

PSO 1	<ul style="list-style-type: none">• To Gain an understanding of the basic knowledge of computer science to• appreciate, develop and implement the solutions to problems in Real Time applications.
PSO 2	<ul style="list-style-type: none">• To Inculcate Skills to analyse a problem and to identify and define the logical modelling of solutions
PSO 3	<ul style="list-style-type: none">• Ability to apply the theoretical concepts and practical knowledge of Computer• Science in analysis, design, development and management of computer based systems and applications in the interdisciplinary domain.
PSO 4	<ul style="list-style-type: none">• To Demonstrate skills to use modern tools, software and equipment for problem solving in new and emerging disciplines.
PSO 5	<ul style="list-style-type: none">• Develop workable solutions for problems drawn either from social context or from research corpus.



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PROGRAMME OUTCOMES (PO)

PO1	<ul style="list-style-type: none">• Apply the knowledge of technological fundamentals, and compute specialized solutions for complex problems.
PO2	<ul style="list-style-type: none">• Develop and conduct appropriate experimentation, analyse and interpret data, and use scientific judgment to draw accurate inferences.
PO3	<ul style="list-style-type: none">• Develop strong reasoning skills to enable them to take successful decisions in problem solving areas.
PO4	<ul style="list-style-type: none">• Create, select, and apply appropriate techniques, resources, and IT tools to model complex computing activities.
PO5	<ul style="list-style-type: none">• Communicate effectively in order to design, implement and evaluate a computational system to meet desired needs within realistic constraints.
PO6	<ul style="list-style-type: none">• Recognize the need, prepare and engage in independent and life-long learning in the broadest context of technological change.
PO7	<ul style="list-style-type: none">• Apply ethical principles and commit to professional ethics and responsibilities and norms of the computer science society.
PO8	<ul style="list-style-type: none">• Perform effectively as an individual, or leader in diverse teams, and in multidisciplinary settings to accomplish a goal.



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FIRST SEMESTER (SYLLABUS)

Course Title: **ADVANCED DESIGN AND ANALYSIS OF ALGORITHMS**

CO1	<ul style="list-style-type: none">• Know the essentials of algorithms. Analyze the asymptotic performance of algorithms. Gain insights of basic elementary data structures.
CO2	<ul style="list-style-type: none">• Describe the divide-and-conquer and greedy paradigm. Explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide-and-conquer, greedy algorithms and analyse them.
CO3	<ul style="list-style-type: none">• Discuss the dynamic-programming paradigm and implementation of dynamic programming in various algorithmic designs and analyze them.
CO4	<ul style="list-style-type: none">• Define the design of backtracking, branch and bound paradigm. Describe the algorithms using this paradigm. Synthesize and analyze them.
CO5	<ul style="list-style-type: none">• Know the concepts of non-deterministic algorithms, Lower bounds theory problems.
CO6	<ul style="list-style-type: none">• Synthesize appropriate algorithm for a design situation

Course Title: **PYTHON FOR DATA SCIENCE**



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CO1	<ul style="list-style-type: none">• Examine Python syntax and semantics and be fluent in the use of Python input output functions.
CO2	<ul style="list-style-type: none">• Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
CO3	<ul style="list-style-type: none">• Interpret/Evaluate the concepts of Object-Oriented Programming using Python.
CO4	<ul style="list-style-type: none">• Demonstrate proficiency in handling Strings and File Systems.
CO5	<ul style="list-style-type: none">• Discover the capabilities of numpy, scipy and matplotlib for scientific programming.
CO6	<ul style="list-style-type: none">• Implement exemplary applications related to Pandas and DataFrames in Python.



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Course Title: COMPUTER NETWORKS

CO1	<ul style="list-style-type: none">• Have knowledge of the basic principles, concepts of computer networks and the design of OSI layers.
CO2	<ul style="list-style-type: none">• To get insights into the Data Link Layer protocols
CO3	<ul style="list-style-type: none">• To provide overview of the Protocols of Medium Access sub layer
CO4	<ul style="list-style-type: none">• To identify the design issues and solutions in the Network Layer
CO5	<ul style="list-style-type: none">• To have basic knowledge of TCP protocol
CO6	<ul style="list-style-type: none">• Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.



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Course Title: **ADVANCED WEB TECHNOLOGY**

CO1	<ul style="list-style-type: none">• Learn the basic knowledge about Internet and also the web contents
CO2	<ul style="list-style-type: none">• Have a good knowledge of HTML tags and CSS.
CO3	<ul style="list-style-type: none">• Gain the Knowledge of JavaScript Exception Handling-OOPS concept
CO4	<ul style="list-style-type: none">• Gain the knowledge of XML applications and Preparing style sheets.
CO5	<ul style="list-style-type: none">• Learn the basic knowledge of NOSQ database.
CO6	<ul style="list-style-type: none">• Implementing MONGODB.



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Course Title: ADVANCED SOFTWARE ENGINEERING

CO1	<ul style="list-style-type: none">• Knows the reason about the basic Software life cycle models• Importance of various kinds of Project Management methods, Tracking Software Quality, Quality Standards and Metrics.
CO2	<ul style="list-style-type: none">• Develop System Concepts for Object Modelling• Design and implement a software design concept to meet desired needs and Requirements.• Design the UML concepts like sequential, Use cases and Activity diagram
CO3	<ul style="list-style-type: none">• Concepts of Use cases, actors, and common modelling techniques. Implement the concept use cases, business actors,• Significance of identifying the subsystems and business requirements
CO4	<ul style="list-style-type: none">• Explain Design Workflow and System Design Concept• Create Mapping Object Model to Database Schema Testing and verification process
CO5	<ul style="list-style-type: none">• Usage of Software Configuration Management Define maintenance and its types.• Build Reverse and re-engineering process.
CO6	<ul style="list-style-type: none">• Build Reverse and re-engineering process.



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Course Title: UNIFIED MODELING LANGUAGE

CO1	<ul style="list-style-type: none">Analyse the basic concepts of object modeling.
CO2	<ul style="list-style-type: none">Demonstrate various Basic Structural Modeling using the appropriate notation
CO3	<ul style="list-style-type: none">Demonstrate various Basic Behavioral Modeling using the appropriate notation
CO4	<ul style="list-style-type: none">Analyse various Advanced Behavioral Modeling using the appropriate notation
CO5	<ul style="list-style-type: none">Analyse Architectural Modeling using the appropriate notation
CO6	<ul style="list-style-type: none">Apply various uml diagrams for software development.



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Course Title: OBJECT ORIENTED ANALYSIS AND DESIGN

CO1	<ul style="list-style-type: none">Analyze object basics and UML.
CO2	<ul style="list-style-type: none">Gain knowledge about attributes and relationships.
CO3	<ul style="list-style-type: none">Interpret axioms and do a case study.
CO4	<ul style="list-style-type: none">Detailed study about Micro level process.
CO5	<ul style="list-style-type: none">Digital signatures.
CO6	<ul style="list-style-type: none">Gain knowledge about various testing strategies.



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**Course Title: PRACTICAL I - PYTHON FOR DATA SCIENCE
LAB**

CO1	<ul style="list-style-type: none">• Interpret the programming task logically and make the pseudo code.
CO2	<ul style="list-style-type: none">• Understand the IDE and write, execute and debug.
CO3	<ul style="list-style-type: none">• Implement the basic string functions.
CO4	<ul style="list-style-type: none">• Apply the concept of pygtk.
CO5	<ul style="list-style-type: none">• Understand the concept of interpret data exploration and data munging.
CO6	<ul style="list-style-type: none">• Understand and apply the knowledge on data science.



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**Course Title: PRACTICAL II – ADVANCED WEB
TECHNOLOGY LAB**

CO1	<ul style="list-style-type: none">• Develop a static web page using various HTML Tags.
CO2	<ul style="list-style-type: none">• Develop an application to embed a map, fixing hotspot, using CSS and hyperlinks.
CO3	<ul style="list-style-type: none">• Validating a web page using Java Script.
CO4	<ul style="list-style-type: none">• Build and implement applications using XML.
CO5	<ul style="list-style-type: none">• Build and develop applications using MongoDB.
CO6	<ul style="list-style-type: none">• Implementing MongoDB using Arrays and embedded docs.



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SECOND SEMESTER (SYLLABUS)

Course Title: DIGITAL IMAGE PROCESSING

CO1	<ul style="list-style-type: none">• Describe the fundamentals of image processing and its applications.
CO2	<ul style="list-style-type: none">• Gain adequate knowledge of Image enhancement techniques in spatial domain
CO3	<ul style="list-style-type: none">• Detailed classification of Image enhancement techniques in frequency domain and compare with spatial domain techniques
CO4	<ul style="list-style-type: none">• Analyze the Image restoration and degradation conceptsIdentify the fundamentals techniques in image segmentation
CO5	<ul style="list-style-type: none">• Acquire a good knowledge of Image compression techniques
CO6	<ul style="list-style-type: none">• Interpret Image segmentation, restoration and compression techniques



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**Course Title: ADVANCED DATABASE MANAGEMENT
SYSTEM**

CO1	<ul style="list-style-type: none">Describe the characteristics of Database Management Systems and about the concepts and models of database.
CO2	<ul style="list-style-type: none">Design ER-models to represent simple database application scenarios.
CO3	<ul style="list-style-type: none">Convert the ER-model to relational tables, populate relational database. Improve the database design by normalization.
CO4	<ul style="list-style-type: none">Describe the fundamental elements of Object and Object relational database management systems.
CO5	<ul style="list-style-type: none">Get the knowledge of Data Warehousing And Distributed DBMS
CO6	<ul style="list-style-type: none">Analyse and describe the Management issues of Mobile databases and Multimedia Databases



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Course Title: ADVANCED JAVA PROGRAMMING

CO1	<ul style="list-style-type: none">• Understand various concepts of Enterprise programming, analyze and implement the RMI Architecture for the necessary applications.
CO2	<ul style="list-style-type: none">• Implement Session management using Servlet and implement JDBC for the database connectivity.
CO3	<ul style="list-style-type: none">• Develop Web applications using JSP and JSP error pages.
CO4	<ul style="list-style-type: none">• Design an application that sends and receives email with attachments.
CO5	<ul style="list-style-type: none">• Study of client server concepts and understanding RPC.
CO6	<ul style="list-style-type: none">• Study and use modern tools for rapidly building enterprise applications.



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Course Title: DATA MINING TECHNIQUES

CO1	<ul style="list-style-type: none">• Appreciate the basic principles, concepts and applications of data mining
CO2	<ul style="list-style-type: none">• Have a good knowledge of the preprocessing techniques
CO3	<ul style="list-style-type: none">• Perform Data Mining using association rules
CO4	<ul style="list-style-type: none">• Get insights from data using classification and prediction techniques
CO5	<ul style="list-style-type: none">• Acquire knowledge of clustering techniques and outliers
CO6	<ul style="list-style-type: none">• Apply data mining techniques to real world data by cleaning the data, integrating the data from different sources, predicting a model to group the data tuples into classes, discovering patterns using association rule mining and grouping the data• set into clusters.



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Course Title: IoT AND ITS APPLICATIONS

CO1	<ul style="list-style-type: none">• Students will be able to understand the vision of IoT
CO2	<ul style="list-style-type: none">• Students will be exemplifying the application of IoT in various domains
CO3	<ul style="list-style-type: none">• Students will be able to understand the differences and similarities between IoT and M2M
CO4	<ul style="list-style-type: none">• Students will be able to interpret the different IoT platforms design methodology
CO5	<ul style="list-style-type: none">• Students will be illustrating various IoT physical devices
CO6	<ul style="list-style-type: none">• Students will able to analyze the physical designs , logical design , architecture overview of M2M and IOT Reference Model.



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Course Title: HIGH SPEED NETWORKS

CO1	<ul style="list-style-type: none">• Identify the existing communication networks, understand the algorithm and technologies involved in internet and associated networks.
CO2	<ul style="list-style-type: none">• Develop specialized knowledge related to the building blocks and operation of high speed networking technology.
CO3	<ul style="list-style-type: none">• Demonstrate the knowledge of network planning and optimization
CO4	<ul style="list-style-type: none">• Apply the concepts to optimize and troubleshoot high speed network.
CO5	<ul style="list-style-type: none">• Use and assist in network design and implementation.
CO6	<ul style="list-style-type: none">• Select the ATM over other available transfer modes in network designs



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Course Title: SOCIAL NETWORK ANALYSIS

CO1	<ul style="list-style-type: none">• Students will be able to define the semantic web and the related applications
CO2	<ul style="list-style-type: none">• Students will be able to outline the knowledge using ontology
CO3	<ul style="list-style-type: none">• Students will be able to interpret the social community and its organization.
CO4	<ul style="list-style-type: none">• Students will be able to identify human behaviour in social web and related communitie
CO5	<ul style="list-style-type: none">• Students will be able to analyse social network
CO6	<ul style="list-style-type: none">• Compare accepted standards and guidelines to select appropriate applications



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Course Title: **PRACTICAL III - ADVANCED JAVA
PROGRAMMING LAB**

CO1	<ul style="list-style-type: none">• Invoke the remote methods in an application using Remote Method Invocation, Access database through Java programs, using Java Database Connectivity.
CO2	<ul style="list-style-type: none">• Manage sessions within an application and communication between sessions.
CO3	<ul style="list-style-type: none">• Implement and manage web sessions using Servlet and JSP. Handling Errors and Exceptions in any web application
CO4	<ul style="list-style-type: none">• Understanding Java Messaging Services done through javamail API.
CO5	<ul style="list-style-type: none">• Develop applications with database connectivity using JDBC
CO6	<ul style="list-style-type: none">• Develop a web page for sending email using Java mail API.



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THIRD SEMESTER (SYLLABUS)

**Course Title: ARTIFICIAL INTELLIGENCE AND MACHINE
LEARNING TECHNIQUES**

CO1	<ul style="list-style-type: none">• Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.
CO2	<ul style="list-style-type: none">• Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them
CO3	<ul style="list-style-type: none">• Impart basic proficiency in representing difficult real life problems in a state space representation so as to solve them using AI techniques like searching and game playing.
CO4	<ul style="list-style-type: none">• Understand the Machine learning types and its main challenges and Perform Data cleaning.
CO5	<ul style="list-style-type: none">• Describe and know about various data classification and Training models .
CO6	<ul style="list-style-type: none">• Explain and understand various regression models and decision Boundaries.



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Course Title: DOT NET TECHNOLOGY

CO1	<ul style="list-style-type: none">• Acquire the knowledge of the .NET environment. Expertise the fundamental concepts in developing the basics of C# programming
CO2	<ul style="list-style-type: none">• Develop, compile and execute console application in C# using object-oriented concepts. Construct console application in C# program using delegates and events
CO3	<ul style="list-style-type: none">• Build a web application in ASP.NET using web server controls
CO4	<ul style="list-style-type: none">• Demonstrate web application with database connectivity
CO5	<ul style="list-style-type: none">• Integrate web application using cookies, sessions and web services
CO6	<ul style="list-style-type: none">• Create a complete web Application for real-time situations



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Course Title: CLOUD COMPUTING

CO1	<ul style="list-style-type: none">• Articulate the main concepts, key technologies, strengths, and limitations, the current and future challenges of cloud computing. Analyse various cloud deployment models and their issues on the cloud.
CO2	<ul style="list-style-type: none">• Identify the architecture and infrastructure of various cloud services including SaaS, PaaS, and IaaS and apply them to develop a applications.
CO3	<ul style="list-style-type: none">• Analyse the implications of cloud collaboration with other applications.
CO4	<ul style="list-style-type: none">• Design and develop various algorithms using tools for virtualization in cloud computing and acquire the knowledge of doing research.
CO5	<ul style="list-style-type: none">• Assess cloud Storage systems and Cloud security, the risks involved, its impact and develop secure cloud applications.
CO6	<ul style="list-style-type: none">• Develop and deploy cloud applications using modern tools and techniques based on the organizational needs.



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Course Title: BIG DATA ANALYTICS

CO1	<ul style="list-style-type: none">• Knows the reason about the evolution of data science and its development. Study the basics of big data analytics and develop the code.• Importance of various kinds of data comparing the other language.
CO2	<ul style="list-style-type: none">• Develop HDFS environment using NOSQL Implementing the queries.• Aggregate the data using NOSQL
CO3	<ul style="list-style-type: none">• Concept of basic Hadoop, data format and analysing the data in the HDFS environment.• Implementing the concept Hadoop pipes and implementations and java interfaces Significance of various methods of compression, serialization
CO4	<ul style="list-style-type: none">• Apply Mapreduce applications, unit test , MRUnit,• Create a file using Mapreduce sorting and shuffling process. Creating input and output format of Mapreduce.
CO5	<ul style="list-style-type: none">• Usage Hadoop related tools.• Definition of hbase,Hbase clients, Cassandra, Pig, HiveQL Life Build data manipulation byHiveQL queries.
CO6	<ul style="list-style-type: none">• Analyze Life Build data manipulation byHiveQL queries.



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Course Title: PRINCIPLES OF CRYPTOGRAPHY

CO1	<ul style="list-style-type: none">Analyse Euclidean Algorithm and Number theory
CO2	<ul style="list-style-type: none">Gain knowledge about Conventional encryption model
CO3	<ul style="list-style-type: none">Apply different encryption and decryption techniques
CO4	<ul style="list-style-type: none">Understanding Key exchanges.
CO5	<ul style="list-style-type: none">Know about message authentication
CO6	<ul style="list-style-type: none">Describe the various Digital signatures logic.



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Course Title: INFORMATION SECURITY

CO1	<ul style="list-style-type: none">• Understand Information Security Principles such as security attacks and services.
CO2	<ul style="list-style-type: none">• Design Terms, concepts related to public key cryptography and digital signatures.
CO3	<ul style="list-style-type: none">• Apply the Concepts of various privacy methods.
CO4	<ul style="list-style-type: none">• Analyse Typical Network Attacks and Threats from the Internet.
CO5	<ul style="list-style-type: none">• Create SNMP, Firewall design Principles and Intrusion detection system.
CO6	<ul style="list-style-type: none">• Create the protections and limitations provided by internet security technology



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**Course Title: INTERNET SECURITY AND COMPUTER
FORENSICS**

CO1	<ul style="list-style-type: none">• Gain a good understanding of the concepts and foundations of computer security and identify vulnerabilities of IT systems
CO2	<ul style="list-style-type: none">• Analyse basic security tools to enhance system security and can develop basic security enhancements in stand-alone applications
CO3	<ul style="list-style-type: none">• Identify some of the factors driving the need for network security and analyse various computer forensics systems
CO4	<ul style="list-style-type: none">• Analyse and summarize duplication and preservation of digital evidence
CO5	<ul style="list-style-type: none">• Illustrate the methods for data recovery, evidence collection and data seizure.



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Course Title: PRACTICAL-V: DOT NET TECHNOLOGY LAB

CO1	<ul style="list-style-type: none">• Design the algorithm
CO2	<ul style="list-style-type: none">• Develop console application using C#
CO3	<ul style="list-style-type: none">• Build and develop web-application using ASP.NET controls and validations
CO4	<ul style="list-style-type: none">• Develop web application using ASP.NET incorporating database connection
CO5	<ul style="list-style-type: none">• Develop web application using ASP.NET using cookies and session
CO6	<ul style="list-style-type: none">• Synthesize console and web application based on requirements



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Course Title: PRACTICAL-VI: BIG DATA ANALYTICS LAB

CO1	<ul style="list-style-type: none">• Derive the steps of algorithms for every exercise.
CO2	<ul style="list-style-type: none">• Scaling up machine learning techniques focusing on industry applications.
CO3	<ul style="list-style-type: none">• Exhibit the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
CO4	<ul style="list-style-type: none">• Implementation of big data analytics
CO5	<ul style="list-style-type: none">• Practice bigdata tools Pig, Hive etc.
CO6	<ul style="list-style-type: none">• Validate the students to have skills that will help them to solve complex real-world problems in for decision support.



DWARAKA DOSS GOVERDHAN DOSS VAISHNAV COLLEGE

(AUTONOMOUS)

Re-accredited with “A++” by NAAC

College with Potential for Excellence, Linguistic Minority Institution

Affiliated to University of Madras

Arumbakkam, Chennai – 600 106

FOURTH SEMESTER (SYLLABUS)

Course Title: PROJECT & VIVA-VOCE

CO1	<ul style="list-style-type: none">• Demonstrate a depth of knowledge of modern technology.
CO2	<ul style="list-style-type: none">• Complete an independent research project, resulting in dissertation.
CO3	<ul style="list-style-type: none">• Communicate effectively and to present ideas clearly and coherently to specific audience in both the written and oral forms.
CO4	<ul style="list-style-type: none">• Self-study, reflect on their learning and take appropriate actions to improve it.