

DEPARTMENT OF COMPUTER SCIENCE WITH DATA ANALYTICS

**Nallamuthu Gounder Mahalingam College
(Autonomous)
(An ISO 9001:2015 Certified Institution)
Re-Accredited with 'B' Grade by NAAC
Pollachi-642001**



SYLLABUS

B.Sc. COMPUTER SCIENCE WITH DATA ANALYTICS

BATCH 2022-2025

Program Educational Objectives (PEOs)	
The B.Sc. Computer Science with Data Analytics program describe accomplishments that graduates are expected to attain within five to seven years after graduation.	
PEO1	Develop in depth understanding of the key technologies in data science and business analytics: data mining, machine learning, visualization techniques, predictive modeling, and statistics
PEO2	Apply principles of Data Science to the analysis of business problem
PEO3	Demonstrate knowledge of statistical data analysis techniques utilized in business decision making.
PEO4	To enhance communicative skill and inculcate the spirit through professional activities and to solve the complex problems in data analysis
PEO5	To embed human values and professional ethics in the young minds and contribute towards nation building

Programme Outcomes (POs)	
On successful completion of the B.Sc. Computer Science with Data Analytics	
PO1	Disciplinary knowledge: Capable to apply the knowledge of mathematics, algorithmic principles and computing fundamentals in the modeling and design of computer based systems of varying complexity.
PO2	Scientific reasoning/ Problem analysis: Ability to critically analyze, categorizes, formulate and solve the problems that emerges in the field of computer science with Data Analytics
PO3	Problem solving: Able to provide software solutions for complex Data Analysis problems or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural, societal and environmental considerations
PO4	Environment and sustainability: Understand the impact of software solutions in environmental and societal context and strive for sustainable development
PO5	Modern tool usage: Use contemporary techniques, skills and tools necessary for integrated solutions
PO6	Ethics: Function effectively with social, cultural and ethical responsibility as an individual or as a team member with positive attitude.
PO7	Cooperation / Team Work: Function effectively as member or leader on multidisciplinary teams to accomplish a common objective.
PO8	Communication Skills: An ability to communicate effectively with diverse types of audience and also able to prepare and present technical documents to different groups.
PO9	Self-directed and Life-long Learning: Graduates will recognize the need for self-motivation to engage in lifelong learning to be in par with changing technology
PO10	Research: Enhance the research culture and uphold the scientific integrity and objectivity.

Program Specific Outcomes (PSOs)	
After the successful completion of B.Sc. Computer Science with Data Analytics program, the students are expected to	
PSO1	Impart education with domain knowledge and key technologies in data science and business analytics like data mining, machine learning, No SQL, visualization techniques, predictive modeling, and statistics effectively and efficiently in par with the expected quality standards for Data analyst professional.
PSO2	Ability to apply the mathematical, technical and critical thinking skills in the discipline of Data analytics to find solutions for complex problems.

PEOs POs \ PSOs	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	H	H	H	L	L
PO2	H	H	H	L	L
PO3	H	H	H	H	L
PO4	L	M	M	M	L
PO5	M	M	M	H	M
PO6	L	L	M	H	L
PO7	M	M	M	H	M
PO8	L	L	L	H	M
PO9	M	M	M	H	L
PO10	M	M	M	M	L
PSO1	H	H	H	M	L
PSO2	H	H	H	H	M

Programme Code:	B.Sc			Programme Title:	Bachelor of Science (Computer Science with Data Analytics)		
Course Code:	22UDA101			Title	Batch:	2022 - 2025	
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem	60	Core I: Programming in C	Semester:	I	
					Credits:	4	

Course Objective

To introduce the concepts of Procedure Oriented Programming and the various programming constructs of C programming

Course Outcome

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remembering the history, importance and basic structure of C Programming	K1
CO2	Interpret the concepts of Variables, Constant, Operators and various types of expressions	K2
CO3	Apply the concept of Decision-making statements and looping constructs for solving basic programs	K3
CO4	Use the concepts of files and pointers inside a C program	K4
CO5	Develop programs incorporating all the C language constructs	K5

Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	M	L	M	L	M	M	H	H
CO2	H	H	H	H	H	L	M	L	M	L	H	H
CO3	M	H	M	H	M	L	M	M	M	L	H	H
CO4	M	H	M	H	M	L	H	L	M	L	H	H
CO5	H	M	H	H	L	L	M	L	M	H	H	H

Programme Code:	B.Sc			Programme Title:	Bachelor of Science (Computer Science with Data Analytics)		
Course Code:	22UDA102			Title	Batch:	2022 - 2025	
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem	60	Core II: Data Structures and Algorithms	Semester:	I	
					Credits:	4	

Course Objective

- To introduce the concept of data structures and the types of data structures
- To demonstrate how various data structures can be implemented and used in various applications

Course Outcome

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Define the concept of Data structure and list the various classifications of data Structures.	K1
CO2	Demonstrate how arrays, stacks, queues, linked lists, trees, heaps, Graphs and Hash Tables are represented in the main memory and various operations are performed on those data structures.	K2
CO3	Illustrate the various file organizations like Sequential, Random and Linked Organizations.	K3
CO4	Discover the real time applications of the various data structures	K4
CO5	Design algorithms for various sorting and searching techniques	K5

Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	M	L	M	L	M	M	H	H
CO2	H	H	H	H	H	L	M	L	H	L	H	H
CO3	M	M	M	H	M	L	M	M	M	L	H	H
CO4	M	H	M	H	M	L	H	L	M	L	H	H
CO5	H	M	H	H	L	L	M	L	M	H	H	H

Programme Code:	B.Sc,			Programme Title:	Bachelor of Science (Computer Science with Data Analytics)		
Course Code:	22UDA1A1			Title	Batch:	2022 - 2025	
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem	60	Allied I Mathematical Foundation for Data Science	Semester:	I	
					Credits:	4	

Course Objective

- To introduce the mathematical foundation for Data Science
- To demonstrate how various mathematical concepts are used in Data Science

Course Outcome

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To introduce the ideas in differential calculus	K1
CO2	To learn about definite integrals and its applications	K2
CO3	To learn the different methods of solving Simultaneous algebraic equation	K3
CO4	To learn about interpolation and its formula	K4
CO5	To introduce different methods of Numerical Differentiation and Numerical integration	K5

Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	L	H	H	H	M	L	M	L	M	M	H	H
CO2	H	M	M	H	H	L	M	L	M	L	H	H
CO3	M	H	M	H	M	M	H	M	M	L	H	H
CO4	M	H	M	H	M	L	H	L	M	L	H	M
CO5	H	M	H	H	L	L	M	L	M	H	H	H

Programme Code:	B.Sc			Programme Title:	Bachelor of Science (Computer Science with Data Analytics)		
Course Code:	22UDA103			Title	Batch:	2022 - 2025	
Lecture Hrs./Week or Practical Hrs./Week	5	Tutorial Hrs./Sem.	75	Core Lab I Programming Lab in C	Semester:	I	
					Credits:	2	

Course Objective

- To introduce the concepts of Procedure Oriented Programming and the various programming constructs of C

Course Outcome

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Apply the various basic programming constructs like decision making statements. Looping statements, functions, structures, pointers and files	K3
CO2	Design programs using the concept of files in C and be able to simulate operations	K4
CO3	Determine the efficient techniques in programming to solve various scientific problems	K5

Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	L	H	H	H	M	L	M	L	M	M	H	H
CO2	H	M	M	H	H	L	M	L	M	L	H	H
CO3	M	H	M	H	M	M	H	M	M	L	H	H

Programme Code:	B.Sc		Programme Title:	Bachelor of Science (Computer Science with Data Analytics)	
Course Code:	22UDA204		Title	Batch:	2022 - 2025
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem.	60	Core III: Object Oriented Programming with Java	Semester: II
				Credits:	4

Course Objective

- To introduce the concepts of Object Oriented Programming Paradigm and the programming constructs of JAVA

Course Outcome

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recite the history of JAVA and its evolution	K1
CO2	Explain the various programming language constructs, object oriented concepts like overloading, inheritance, polymorphism, Interfaces , threads, exception handling and packages.	K2
CO3	Illustrate the concepts of Applets, files and the concept of stream classes.	K3
CO4	Outline the benefits and applications of objects oriented programming concepts and defend how JAVA differs from other programming languages	K4
CO5	Judge the pros and cons of other object oriented language with the concepts of JAVA	K5

Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	M	L	M	L	M	M	H	H
CO2	H	L	H	H	H	L	M	L	M	L	H	H
CO3	M	H	M	H	M	L	M	M	M	M	H	H
CO4	M	L	M	H	H	L	H	L	M	L	H	H
CO5	H	M	H	H	L	L	M	L	M	H	H	H

Programme Code:	B.Sc		Programme Title:	Bachelor of Science (Computer Science with Data Analytics)		
Course Code:	22UDA205		Title	Batch:	2022 - 2025	
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem.	60	Core IV: Operating System	Semester:	II
				Credits:	4	

Course Objective

The objective of the course is to enable the students to understand the concepts of operating system including Process management, Storage management, Scheduling and windows.

Course Outcome

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember the basic concepts Operating System	K1
CO2	To understand the concepts of Storage Allocation, Process Management, and Scheduling Algorithms	K2
CO3	To apply the Process Management principles and functionalities in Database Systems	K3
CO4	Understanding the File concepts	K4
CO5	To review the case studies in Windows	K5

Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	M	L	M	L	M	M	H	H
CO2	H	L	H	H	H	L	M	L	M	L	H	M
CO3	M	H	M	H	H	L	M	M	M	H	H	H
CO4	L	L	M	H	H	L	H	L	M	L	H	M
CO5	H	M	H	H	M	L	L	L	M	H	H	H

Programme Code:	B.Sc		Programme Title:	Bachelor of Science (Computer Science with Data Analytics)	
Course Code:	22UDA2A1		Title	Batch:	2022 - 2025
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem.	60	ALLIED II: Statistics and Probability	Semester: II
				Credits:	4

Course Objective

To introduce the concepts of statistics and Probability in the field of Data Science

Course Outcome

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.	K1
CO2	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.	K2
CO3	Apply the concept of testing of hypothesis for small and large samples in real life problems	K3
CO4	Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control.	K4
CO5	Have the notion of sampling distributions and statistical techniques used in engineering and Management problems.	K5

Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	L	H	M	L	L	L	M	M	H	H
CO2	H	L	H	H	H	L	M	L	M	L	H	M
CO3	M	H	M	H	H	L	M	M	M	H	H	H
CO4	L	L	M	H	H	L	H	L	H	L	H	L
CO5	H	M	H	H	M	H	L	L	H	H	H	H

Programme Code:	B.Sc		Programme Title:	Bachelor of Science (Computer Science with Data Analytics)		
Course Code:	22UDA206		Title	Batch:	2022 - 2025	
Lecture Hrs./Week or Practical Hrs./Week	5	Tutorial Hrs./Sem.	75	Core Lab II Programming Lab in Java	Semester:	II
					Credits:	2

Course Objective

- To introduce the concepts of Object Oriented Programming Paradigm and the programming constructs of JAVA

Course Outcome

On the successful completion of the course, students will be able to


CO Number	CO Statement	Knowledge Level
CO1	Apply the various basic programming constructs of JAVA like decision making statements. Looping statements, overloading, inheritance, polymorphism, constructors and destructors	K3
CO2	Illustrate the concepts of threading and multi-threading	K4
CO3	Design programs using various file stream classes; file types, and frames	K5

Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	L	H	H	H	M	L	M	L	M	M	H	H
CO2	H	M	M	H	H	L	M	L	M	L	H	H
CO3	M	H	M	H	M	M	H	M	M	L	H	H

Programme Code:	B.Sc.	Programme Title:	Bachelor of Science (Computer Science with Data Analytics)	
Course Code:	22UDA207	Title	Batch:	2022- 2025
		Capstone Project - I	Semester:	II




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