

Artificial Intelligence and Machine Learning
Semester –III

22APC301 - DATA STRUCTURES		Sem: 3
COURSE OUTCOMES:		POs Mapped
At the end of the course students will be able to.		
CO1	Explain algorithm analysis techniques, Abstract Data Types (ADT), and the organization and operations of fundamental data structures.	PO1,PO2
CO2	Apply linear data structures such as arrays, linked lists, stacks, and queues to implement solutions for computational problems.	PO1,PO2,PO3
CO3	Analyze the performance of tree structures, graph algorithms, searching methods, and sorting techniques using appropriate complexity measures.	PO2,PO3
CO4	Design efficient solutions using trees, graphs, hashing, and advanced data structures for real-world applications.	PO3,PO6
CO5	Develop programs implementing searching, sorting, hashing, traversal, and optimization algorithms using suitable data structures.	PO3,PO5,PO6,PO8,PO11
CO6	Evaluate case studies involving route optimization, network analysis, scheduling systems, database indexing, and resource management using appropriate data structures, and communicate findings through technical reports and seminar presentations.	PO4,PO5,PO7,PO8,PO9,PO10,PO11

CO-PO MAPPING

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3										3	1	1
CO2	3	3	3									3	2	1
CO3		3	3									3	2	2
CO4			3			3						3	3	3
CO5			3		2	3		2			2	3	3	3
CO6				3	2		2	2	3	2	2	3	3	3
22APC301	3	3	3	3	2	3	2	2	3	2	2	3	2	2

22APC302 - FOUNDATIONS OF DATA SCIENCE		Sem: 3
COURSE OUTCOMES:		POs Mapped
At the end of the course students will be able to.		
CO1	Describe the fundamental data structures and functions in R (arrays, matrices, lists, data frames, factors), and explain basic statistical concepts including types of data, variables, distributions, and normal/standard (z) scores used in data science.	-
CO2	Apply R programming techniques to import, organize, and visualize data using graphical methods (plots, multivariate/matrix plots), and compute descriptive statistics such as averages, variability, and correlation coefficients for real-world datasets.	PO1,PO5 PSO1, PSO2
CO3	Analyze relationships between variables using correlation and sampling distributions to draw meaningful inferences about underlying data patterns	PO2, PO5, PSO1, PSO2
CO4	Evaluate statistical hypotheses using z-tests (one-tailed and two-tailed) null and alternate hypothesis formulation, and confidence interval estimation to assess the validity of data-driven claims.	PO1, PO3, PO5, PSO1, PSO2, PSO3
CO5	Design and construct predictive models using linear and logistic regression in R, and evaluate model quality by interpreting coefficients and model summaries to solve real-world data science problems	PO4, PO5, PO6, PO8, PO9, PO10, PO11, PSO1, PSO2, PSO3

CO -PO MAPPING

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1														
CO2	3				3							3	3	
CO3		3			3							3	1	
CO4	1		3		2							3	3	1
CO5				3	3	1		2	2	2	1	3	3	3
22APC302	2	3	3	3	3	1		2	2	2	1	3	3	2

22APC303 - PROGRAMMING IN PYTHON		Sem: 3
COURSE OUTCOMES:		POs Mapped
At the end of the course students will be able to.		
CO1	Apply Python programming constructs, control structures and functions to develop solutions for computational problems.	PO1, PO2, PO3, PSO1, PSO2, PSO3
CO2	Analyze and implement suitable Python data structures, modular programming techniques and object-oriented concepts for real-world applications.	PO1, PO2, PO3, PO4, PSO1, PSO2, PSO3
CO3	Create Python programs incorporating exception handling, file processing and reusable modules for efficient software development.	PO1, PO2, PO3, PO4, PO5, PSO1, PSO2, PSO3
CO4	Analyze numerical data and develop visualization models using Python scientific and analytical libraries.	PO1, PO2, PO3, PO4, PO5, PO8, PO10, PSO1, PSO2, PSO3
CO5	Create data analysis applications using Pandas, NumPy and machine learning workflows for extracting meaningful insights from datasets.	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO10, PSO1, PSO2, PSO3
CO6	Analyze and develop real-world applications integrating programming, data processing and visualization techniques using Python	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO10, PSO1, PSO2, PSO3

CO -PO MAPPING

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1									3	1	1
CO2	3	3	2	1								3	2	1
CO3	3	2	3	1								2	2	1
CO4	2	3	2	3	3							3	2	2
CO5	3	3	3	3	3			1		1		3	3	2
CO6	3	3	3	3	3	3		1		1		3	3	3
22APC303	3	3	2	2	2	1		1		1		3	2	2

22APC304 - DATA STRUCTURES LABORATORY		Sem: 3
COURSE OUTCOMES:		POs Mapped
At the end of the course students will be able to.		
CO1	Apply linear data structures such as arrays, linked lists, stacks, and queues to implement and solve computational problems using C.	PO1,PO5
CO2	Analyze the performance of searching, sorting, tree, and graph algorithms by evaluating their time and space complexities through experimentation.	PO2,PO4,PO10,PO11
CO3	Design efficient algorithmic solutions by selecting appropriate data structures such as trees, graphs, and hashing techniques for given problem statements.	PO2,PO3,PO5,PO7,PO8,PO9,PO11
CO4	Develop robust C programs to implement linear and non-linear data structures and their associated algorithms for real-world applications.	PO3,PO5,PO8,PO9,PO11
CO5	Create application-oriented solutions or mini-projects by integrating suitable data structures and algorithms to solve practical computing problems.	PO3,PO4,PO5,PO7,PO8,PO10,PO11
CO6	Evaluate the effectiveness of different data structures and algorithms through case studies, program testing, technical documentation, viva-voce, and seminar presentations.	PO2,PO4,PO6,PO8,PO9,PO10,PO11

CO -PO MAPPING

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3				3							3	2	1
CO2		3		3						2	2	3	2	2
CO3		3	3		3		2	3	2		3	3	3	2
CO4			3		3			2	2		2	3	3	3
CO5			3	3	3		2	3		2	3	3	3	3
CO6		3		3		3		2	3	2	2	2	3	3
22APC304	3	3	3	3	3	3	2	3	2	2	2	3	3	2

22APC305 - PROGRAMMING IN PYTHON LABORATORY		Sem: 3
COURSE OUTCOMES:		POs Mapped
At the end of the course students will be able to.		
CO1	Apply Python programming constructs, control structures and user-defined functions to implement computational solutions.	PO1, PO2, PO3, PO5, PSO1, PSO2, PSO3
CO2	Analyze and develop object-oriented Python applications using classes, inheritance and polymorphism concepts.	PO1, PO2, PO3, PO4, PO5, PSO1, PSO2, PSO3
CO3	Create applications using Python built-in data structures, string processing and file handling techniques.	PO1, PO2, PO3, PO4, PO5, PSO1, PSO2, PSO3
CO4	Analyze and evaluate numerical and structured data using NumPy and Pandas libraries.	PO1, PO2, PO3, PO4, PO5, PSO1, PSO2, PSO3
CO5	Create customized graphical visualizations and interpret analytical results using Matplotlib and Seaborn libraries.	PO1, PO2, PO3, PO4, PO5, PSO1, PSO2, PSO3
CO6	Develop and evaluate machine learning and data analysis solutions using Scikit-learn for real-world applications.	PO1, PO2, PO3, PO4, PO5, PO6, PSO1, PSO2, PSO3
CO7	Create an end-to-end Python-based data analysis and visualization mini project integrating programming, analytical and visualization techniques	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO9, PO10, PO11, PSO1, PSO2, PSO3

CO -PO MAPPING

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1		2							3	1	1
CO2	3	3	2	1	2							3	2	1
CO3	3	2	3	1	3							2	2	1
CO4	2	3	2	3	3							3	2	2
CO5	2	3	3	2	3							3	3	2
CO6	3	3	3	3	3	1						3	3	3
CO7	3	3	3	3	3	1		1	2	2	1	3	3	3
22APC305	3	3	2	2	3	1		1	1	1	1	3	2	2