

BDS.CO2	3	1	-	-	3	-	-	-	-	-	1	3	2
BDS.CO3	2	3	1	2	1	-	-	-	-	-	-	3	3
BDS.CO4	1	2	2	3	3	1	-	-	-	-	2	3	2
BDS.CO5	1	2	2	3	3	1	-	-	-	-	2	3	3
Average	2.00	2.00	1.67	2.67	2.33	1.00	-	-	-	-	1.67	2.80	2.40

Semester No:	IV		
Course Title:	Exploratory Data Analysis , (EDA)	Course Code:	U24CD302
Course Outcome No.	Course Outcome Statement		
EDA.CO1	Fundamental concepts and importance of Exploratory Data Analysis (EDA)		
EDA.CO2	Use Python libraries like Pandas to manipulate and clean data effectively.		
EDA.CO3	Analyse single variable data through visual and statistical methods.		
EDA.CO4	Examine relationships between two variables using correlation and regression techniques.		
EDA.CO5	Explore and create meaningful data visualizations to represent insights clearly.		

Course Articulation Matrix:

Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
EDA.CO1	3	3	2	2	1	2	1	-	-	-	-	2	3
EDA.CO2	2	3	2	2	2	2	1	-	-	-	-	3	3
EDA.CO3	2	2	3	3	2	1	2	-	-	-	-	2	2
EDA.CO4	1	2	2	3	3	2	1	-	-	-	-	3	3
EDA.CO5	1	1	2	2	2	3	1	-	-	-	-	2	2
Average	1.8	2.2	2.4	2.4	2	2	1.2	-	-	-	-	2.4	2.6

Semester No:	IV		
Course Title:	Open Elective-I Digital Electronics and Computer Organization , (DECO)	Course Code:	U24EC304
Course Outcome No.	Course Outcome Statement		
DECO.CO1	Demonstrate the number system conversions and simplify Boolean functions.		
DECO.CO2	Analyze and simplify Boolean expressions using Karnaugh maps, tabulation method and design combinational circuits.		
DECO.CO3	Analyze and design various sequential circuits.		
DECO.CO4	To illustrate the operation of digital computer and to understand its organization.		
DECO.CO5	Understand the various memory types.		

Course Articulation Matrix:

Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2
DECO.CO1	3	3	2	2	-	-	-	-	-	-	3	2	2
DECO.CO2	3	3	2	2	-	-	-	-	-	-	3	3	2
DECO.CO3	3	3	2	3	-	-	-	-	-	-	3	2	2
DECO.CO4	3	1	1	2	-	-	-	-	-	-	3	1	2
DECO.CO5	3	1	1	2	-	-	-	-	-	-	3	2	2
Average	3.0	2.2	1.6	2.2	-	-	-	-	-	-	3.0	2.0	2.0

Semester No:	IV		
Course Title:	Database Management System , (DBMS)	Course Code:	U24IT301
Course Outcome No.	Course Outcome Statement		
DBMS.CO1	Create ER models for database applications and develop SQL queries, involving designing and constructing database solutions.		
DBMS.CO2	Apply the concepts of relational algebra and relational calculus to formulate database queries.		
DBMS.CO3	Understand normalization concepts and functional dependencies and identify their role in designing efficient databases.		
DBMS.CO4	Apply transaction management concepts, concurrency control, and recovery techniques in database systems.		
DBMS.CO5	Analyze query execution and evaluation techniques to understand query processing and optimization.		

Course Articulation Matrix:

Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO10	PO11	PSO 1	PSO2
DBMS.CO1	3	2	3	-	3	-	-	-	-	-	1	3	2
DBMS.CO2	3	3	2	-	2	-	-	-	-	-	1	3	3
DBMS.CO3	3	3	2	1	2	-	-	-	-	-	1	3	3
DBMS.CO4	3	3	2	2	3	-	-	1	-	-	1	3	3
DBMS.CO5	3	3	2	3	3	-	-	1	1	-	2	3	3
Average	3	2.8	2.2	2	2.6	-	-	1	1	-	1.2	3	2.8

Semester No:	IV		
Course Title:	Data Structures, (DS)	Course Code:	U24CS302
Course Outcome No.	Course Outcome Statement		
DS.CO1	Implement various kinds of sorting techniques and apply appropriate techniques for solving a given problem.		
DS.CO2	Implement various data structures using arrays and linked lists.		
DS.CO3	Develop ADT necessary for solving problems based on Stacks and Queues.		
DS.CO4	Implement hash functions and handle collisions.		
DS.CO5	Implement binary trees, general tree structures, advanced search trees, heaps, and graphs.		

Course Articulation Matrix:

Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
DS.CO1	3	3	3	2	2	1	-	-	-	2	-	3	2
DS.CO2	3	3	3	2	2	2	-	-	1	2	-	3	3
DS.CO3	3	3	3	2	2	2	-	-	1	2	1	3	3
DS.CO4	3	3	3	3	3	3	-	-	2	2	2	3	3
DS.CO5	3	3	3	2	2	3	-	-	2	1	2	3	3
Average	3.0	3.0	3.0	2.2	2.2	2.2	-	-	1.2	1.8	1.0	3.0	2.8

Semester No:	IV		
Course Title:	Data Science using R lab , (R Lab)	Course Code:	U24CD3L1
Course Outcome No.	Course Outcome Statement		
R Lab.CO1	Explain the fundamentals of data science, data analytics, and the R programming environment.		
R Lab.CO2	Apply R programming concepts, data types, operators, control structures, functions, and packages.		
R Lab.CO3	Perform data preprocessing, cleaning, transformation, and exploratory data analysis (EDA) using R.		
R Lab.CO4	Analyze datasets using descriptive statistics and create meaningful visualizations using R.		
R Lab.CO5	Develop basic predictive models using statistical and machine learning techniques in R.		

Course Articulation Matrix:

Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
R Lab.CO1	3	2	-	-	2	-	-	-	-	-	1	3	1
R Lab.CO2	3	3	2	-	3	-	-	-	-	-	2	3	2
R Lab.CO3	2	3	2	2	3	-	-	-	-	-	2	3	2
R Lab.CO4	2	3	2	3	3	-	-	-	-	1	2	3	2
R Lab.CO5	3	3	3	3	3	1	1	1	1	1	2	3	3
Average	2.6	2.8	2.2	2.7	2.8	1.0	1.0	1.0	1.0	1.0	1.8	3.0	2.0

Semester No:	IV		
Course Title:	Database Management System Lab , (DBMS Lab)	Course Code:	U24IT3L1
Course Outcome No.	Course Outcome Statement		
DBMS Lab.CO1	Design a relational database schema for a given application by applying database modeling concepts and normalization techniques.		
DBMS Lab.CO2	Apply SQL Data Definition Language (DDL) and Data Manipulation Language commands to create, modify, retrieve, and manage database objects and data.		
DBMS Lab.CO3	Develop and utilize database objects such as Views and Stored Procedures to improve data access, security, and reusability.		
DBMS Lab.CO4	Develop database applications using PL/SQL constructs, including Procedures, Cursors, and Triggers, to automate database operations.		
DBMS Lab.CO5	Design a simple database application by integrating database design principles, SQL programming, and database management techniques.		

Course Articulation Matrix:

Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
DBMS Lab.CO1	3	3	3	2	2	-	-	-	-	-	2	3	3
DBMS Lab.CO2	3	2	2	-	3	-	-	-	-	-	2	3	2
DBMS Lab.CO3	3	2	3	1	3	-	-	-	-	-	2	3	3
DBMS	3	3	3	2	3	-	-	1	1	-	2	3	3

Lab.CO4													
DBMS Lab.CO5	3	3	3	2	3	-	-	2	2	1	2	3	3
Average	3	2.6	2.8	1.7	2.8	-	-	1.5	1.5	1	2	3	2.8

Semester No:	IV		
Course Title:	Data Structures Lab , (DS Lab)	Course Code:	U24CS3L1
Course Outcome No.	Course Outcome Statement		
DS Lab.CO1	Demonstrate searching and sorting algorithms and select appropriate techniques for different problem scenarios.		
DS Lab.CO2	Apply stack and queue operations to solve computational problems.		
DS Lab.CO3	Evaluate binary trees, general tree structures, advanced search trees, heaps, graphs.		
DS Lab.CO4	Develop hashing techniques using suitable hash functions and collision resolution methods.		
DS Lab.CO5	Implement various kinds of sorting techniques and apply appropriate techniques for solving a given Problem.		

Course Articulation Matrix:

Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PSO1	PSO2
DS Lab.CO1	3	3	2	-	2	-	-	-	-	-	-	3	2

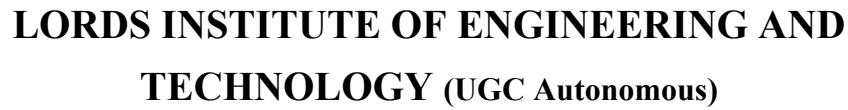
DS Lab.CO2	3	2	3	-	3	-	-	-	-	-	-	3	3
DS Lab.CO3	3	3	3	2	3	-	-	-	-	-	-	3	3
DS Lab.CO4	3	3	2	2	3	-	-	-	-	-	-	3	2
DS Lab.CO5	3	3	3	2	3	-	-	-	1	-	-	3	3
Average	3	3	2	-	2	-	-	-	-	-	-	3	2

Semester No:	IV		
Course Title:	Design Thinking Lab , (DT Lab)	Course Code:	U24DT3L1
Course Outcome No.	Course Outcome Statement		
DT Lab.CO1	Understand the principles of design thinking and interpret user requirements through effective listening and observation.		
DT Lab.CO2	Conduct user-centric field research to empathize with users and define clear problem statements.		
DT Lab.CO3	Generate, analyze, and evaluate innovative ideas collaboratively to address identified problems.		
DT Lab.CO4	Design, develop, test, and refine functional prototypes using iterative feedback.		
DT Lab.CO5	Evaluate and communicate project outcomes effectively through storyboards and presentations while demonstrating ethical and sustainable design practices.		

Course Articulation Matrix:

Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
DT Lab.CO1	2	1	2	-	-	-	-	2	2	2	1	2	2
DT Lab.CO2	2	3	2	3	-	2	-	2	2	-	1	2	2
DT Lab.CO3	2	3	3	2	2	-	-	3	3	2	2	3	2
DT Lab.CO4	2	3	3	3	3	-	-	2	2	2	2	3	2
DT Lab.CO5	2	1	2	-	-	-	-	2	2	2	1	2	2
Average	1	2	3	1	-	3	3	3	3	3	2	2	1



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DEPARTMENT OF CSE-DATA SCIENCE

Course Outcomes & Course Articulation Matrix

ACADEMIC YEAR: 2026-27

Semester No:	VI		
Course Title:	Artificial Intelligence, (AI)	Course Code:	U24CD501
Course Outcome No.	Course Outcome Statement		
AI.CO1	Demonstrate the fundamental concepts of Artificial Intelligence, including problem-solving, search techniques, and knowledge representation.		
AI.CO2	Explain the design and implementation of intelligent agents, expert systems, and Bayesian networks.		
AI.CO3	Apply Artificial Intelligence learning paradigms and algorithms to solve real-world problems.		
AI.CO4	Analyze expert systems and evaluate their applications in practical problem-solving scenarios.		
AI.CO5	Evaluate Machine Learning techniques and Artificial Intelligence applications for real-world decision-making and intelligent systems.		

Course Articulation Matrix:

Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2

Al.CO1	3	2	1	1	-	-	-	-	1	-	2	2	1
Al.CO2	3	3	2	2	1	-	-	-	1	-	2	3	2
Al.CO3	3	3	3	2	3	-	-	-	2	1	2	3	3
Al.CO4	3	3	2	3	2	-	-	-	2	1	2	3	2
Al.CO5	3	3	3	3	3	-	-	1	2	2	3	3	3
Average	3.0	2.8	2.2	2.2	2.3	-	-	1.0	1.6	1.3	2.2	2.8	2.2

Semester No:	VI		
Course Title:	Full Stack Web Development, (FSWD)	Course Code:	U24CD502
Course Outcome No.	Course Outcome Statement		
FSWD.CO1	Explain how the World Wide Web works, including web browsers and web servers.		
FSWD.CO2	Design responsive and structured web pages using HTML, CSS, Flexbox, and Grid.		
FSWD.CO3	Use JavaScript to add interactivity, form validation, and DOM manipulation to web pages.		
FSWD.CO4	Create dynamic web applications using server-side scripts with Python or Ruby.		
FSWD.CO5	Connect web pages with databases to build interactive and data-driven websites.		

Course Articulation Matrix:

Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)	Program Specific Outcomes (PSO's)
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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
FSWD.CO 1	3	2	-	-	1	-	-	-	-	1	1	-	3
FSWD.CO 2	2	2	2	-	3	-	-	-	2	2	2	-	3
FSWD.CO 3	2	3	2	1	3	-	-	-	2	2	2	-	3
FSWD.CO 4	3	2	3	2	3	-	-	-	3	2	3	1	3
FSWD.CO 5	2	2	3	1	3	-	-	-	2	2	3	1	3
Average	2.4	2.2	2	0.8	2.6	-	-	-	1.8	1.8	2.2	0.4	3

Semester No:	VI		
Course Title:	Discrete Mathematics, (DM)	Course Code:	U24CD503
Course Outcome No.	Course Outcome Statement		
DM.CO1	Apply Propositional Logic and Predicate Logic to analyze and solve problems across different domains.		
DM.CO2	Demonstrate the concepts of Set Theory, Venn Diagrams, Relations, and Functions to solve real-world problems.		
DM.CO3	Analyze and solve recurrence relations and generating function problems for mathematical and computational applications.		
DM.CO4	Analyze the properties of Graphs and Trees to model and solve basic real-world applications.		
DM.CO5	Explain the characteristics of Algebraic Systems and Lattices as partially ordered sets and apply them to practical problems.		

Course Articulation Matrix:

Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
DM.CO1	3	3	2	-	2	-	-	-	-	-	2	2	3
DM.CO2	3	3	2	-	2	-	-	-	-	-	2	3	2
DM.CO3	3	3	2	2	2	-	-	-	-	-	-	2	3
DM.CO4	3	3	3	-	2	-	-	-	-	-	-	3	3
DM.CO5	3	2	2	-	2	-	-	-	-	-	2	2	2
Average	3.0	2.8	2.2	2.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	2.4	2.6

Semester No:	VI		
Course Title:	Computer Networks, (CN)	Course Code:	U24CS501
Course Outcome No.	Course Outcome Statement		
CN.CO1	Explain the function of each layer of OSI and trace the flow of information from one Node to another node in the network.		

CN.CO2	Understand the concepts of transmission media, flow control, and error detection and correction techniques used in computer networks.
CN.CO3	Apply the principles of IP addressing and Internet routing to analyze network communication.
CN.CO4	Explain the working principles of network applications such as DNS, E-mail, File Transfer, and the World Wide Web (WWW).
CN.CO5	Design and implement client–server socket-based network applications using standard networking protocols.

Course Articulation Matrix:

Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CN.CO1	2	1	-	-	1	-	-	-	-	-	1	3	-
CN.CO2	2	1	-	-	2	-	-	-	-	-	1	3	-
CN.CO3	3	3	3	3	2	-	-	-	-	2	1	3	3
CN.CO4	1	1	-	1	1	-	-	-	-	-	1	3	-
CN.CO5	1	1	2	-	2	-	-	1	2	1	2	3	3
Average	1.8	1.4	2.5	2	1.6	-	-	1	2	1.5	1.2	3	3

Semester No:	VI		
Course Title:	Professional Elective-I Software Engineering, (SE)	Course Code:	U24CD506
Course Outcome No.	Course Outcome Statement		
SE.CO1	Describe and compare alternative approaches and techniques used across various phases of the Software Development Life Cycle.		
SE.CO2	Develop a complete software project independently by applying appropriate design principles, tools, and methodologies.		
SE.CO3	Identify and analyze the real-world challenges involved in developing large-scale software systems.		
SE.CO4	Design and construct software architecture independently or in a team by recognizing recurring problems and applying relevant design patterns.		
SE.CO5	Evaluate software product quality using appropriate metrics while addressing practical development challenges.		

Course Articulation Matrix:

Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO2
SE.CO1	3	2	2	2	1	-	-	1	1	1	2	2
SE.CO2	3	3	3	2	3	-	-	2	2	2	2	3
SE.CO3	3	3	2	3	2	-	-	1	2	1	2	3

SE.CO4	3	3	3	2	3	-	-	2	3	2	2	3
SE.CO5	2	3	2	3	2	-	-	2	2	2	3	2
Average	2.8	2.8	2.4	2.4	2.2	-	-	1.6	2.0	1.6	2.2	2.6

Semester No:	VI		
Course Title:	Artificial Intelligence Lab, (AI Lab)	Course Code:	U24CD5L1
Course Outcome No.	Course Outcome Statement		
AI Lab.CO1	Apply Artificial Intelligence techniques and problem-solving strategies to solve computational problems.		
AI Lab.CO2	Design and implement intelligent systems capable of learning and adapting to different environments.		
AI Lab.CO3	Select and apply appropriate Artificial Intelligence learning algorithms for different problem domains.		
AI Lab.CO4	Develop and evaluate expert system applications for intelligent decision-making.		
AI Lab.CO5	Apply Machine Learning techniques to analyze data, build predictive models, and evaluate their performance.		

Course Articulation Matrix:

Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2

AI Lab.CO1	3	2	2	2	2	-	-	-	1	-	2	3	2
AI Lab.CO2	3	3	3	2	3	-	-	-	2	1	2	3	3
AI Lab.CO3	3	3	2	2	3	-	-	-	2	1	2	3	3
AI Lab.CO4	3	3	3	3	2	-	-	1	2	1	2	3	3
AI Lab.CO5	3	3	3	3	3	-	-	1	2	2	3	3	3
Average	3	2	2	2	2	-	-	-	1	-	2	3	2

Semester No:	VI		
Course Title:	Full Stack Web Development Lab, (FSWD Lab)	Course Code:	U24CD5L 2
Course Outcome No.	Course Outcome Statement		
FSWD Lab.CO1	Develop well-structured HTML web pages with embedded CSS styles.		
FSWD Lab.CO2	Apply various CSS properties to create visually appealing and responsive layouts.		
FSWD Lab.CO3	Write JavaScript programs to add dynamic behavior to web pages.		
FSWD Lab.CO4	Validate forms using client-side JavaScript and handle user input efficiently.		
FSWD Lab.CO5	Deploy web applications and demonstrate the ability to build full-stack web solutions.		

Course Articulation Matrix:

Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
FSWD Lab.CO1	3	2	-	-	2	-	-	-	-	-	1	2	2
FSWD Lab.CO2	3	3	2	2	3	-	-	-	-	-	1	3	2
FSWD Lab.CO3	2	3	3	2	3	-	-	-	-	-	2	3	3
FSWD Lab.CO4	2	3	3	3	3	2	-	-	-	-	2	3	3
FSWD Lab.CO5	3	3	3	3	3	2	-	2	1	2	3	3	3
Average	2.6	2.8	2.2	2.0	2.8	0.8	0.0	0.4	0.2	0.4	1.8	2.8	2.6

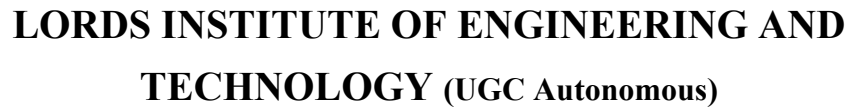
Semester No:	VI		
Course Title:	Internship, (INT)	Course Code:	U24CD5P1
Course Outcome No.	Course Outcome Statement		
INT.CO1	Identify and analyze industry problems by applying engineering knowledge and understanding workplace practices.		
INT.CO2	Analyze the assigned engineering problem and identify feasible alternative solutions.		
INT.CO3	Design and develop a hardware/software solution to meet the specified project requirements.		
INT.CO4	Demonstrate professional ethics, teamwork, effective communication, and responsible work practices during the internship.		
INT.CO5	Prepare technical reports and deliver presentations to communicate the project outcomes effectively.		

Course Articulation Matrix:

Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
INT.CO1	3	2	-	-	-	-	-	-	-	-	-	2	1
INT.CO2	2	3	2	2	-	-	-	-	-	-	-	2	1
INT.CO3	2	2	3	2	2	-	-	-	-	-	-	3	2

INT.CO4	-	-	-	-	-	2	1	3	3	2	1	-	-
INT.CO5	-	-	-	-	-	-	-	-	2	3	2	-	1
Average	1.4	1.4	1.0	0.8	0.4	0.4	0.2	0.6	1.0	1.0	0.6	1.4	1.0



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Survey No. 32, Himayat Sagar, Near TG Police Academy, Hyderabad-500091, Telangana

DEPARTMENT OF CSE-DATA SCIENCE

Course Outcomes & Course Articulation Matrix

ACADEMIC YEAR: 2026-27

Semester No:	VIII		
Course Title:	Cloud Computing, (CC)	Course Code:	U23CD701
Course Outcome No.	Course Outcome Statement		
CC.CO1	Explain the fundamental concepts, architecture, technologies, and service models of cloud computing.		
CC.CO2	Analyse the security, privacy, and interoperability issues in cloud computing.		
CC.CO3	Demonstrate the use of various online cloud services and platforms.		
CC.CO4	Evaluate the cloud computing paradigm, deployment models, advantages, and challenges.		
CC.CO5	Apply data centre concepts to optimize power, efficiency, and cost in cloud computing.		

Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2

CC.CO1	3	2	–	–	2	–	–	–	–	–	1	2	1
CC.CO2	2	3	–	2	2	2	2	–	–	–	1	2	2
CC.CO3	2	2	2	–	3	–	–	2	2	–	2	3	3
CC.CO4	2	3	2	2	2	2	–	–	–	–	2	2	3
CC.CO5	3	2	3	2	3	3	–	–	–	2	2	3	2
Average	2.4	2.4	1.4	1.2	2.4	1.4	0.4	0.4	0.4	0.4	1.6	2.4	2.2

Semester No:	VIII		
Course Title:	Data Handling and Data Visualization, (DHDV)	Course Code:	U23CD702
Course Outcome No.	Course Outcome Statement		
DHDV.CO1	Apply appropriate techniques to handle missing data in real-world datasets using statistical and programming methods.		
DHDV.CO2	Interpret and summarize dataset characteristics using basic statistical measures, and construct visual representations using graphs and plots.		
DHDV.CO3	Analyze data distributions to identify and differentiate outliers using statistical and visual methods.		
DHDV.CO4	Analyze high-dimensional data and design appropriate dimensionality reduction techniques to visualize objects in different dimensions for effective data presentation.		
DHDV.CO5	Implement virtualization techniques and develop interactive visual platforms to support data exploration in research projects.		

Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)	Program Specific Outcomes (PSO's)
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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
DHDV.CO 1	3	2	2	1	1	2	1	-	-	-	-	2	2
DHDV.CO 2	2	3	2	2	2	2	1	-	-	-	-	3	3
DHDV.CO 3	2	2	3	3	2	1	2	-	-	-	-	2	2
DHDV.CO 4	1	2	2	3	3	2	1	-	-	-	-	3	3
DHDV.CO 5	1	1	2	2	2	3	1	-	-	-	-	2	2
Average	1.8	2	2.2	2.2	2	2	1.2	-	-	-	-	2.4	2.4

Semester No:	VIII		
Course Title:	Text Mining	Course Code:	U23CD70 3
Course Outcome No.	Course Outcome Statement		
TM.CO1	Explain the fundamental concepts, architecture, preprocessing techniques, and query languages used in text mining systems.		
TM.CO2	Apply text categorization methods, document representation techniques, and machine learning algorithms for text classification.		
TM.CO3	Analyze and implement text clustering and information extraction techniques to discover patterns and extract knowledge from textual data.		
TM.CO4	Apply probabilistic models and visualization techniques for text mining and text analytics applications.		
TM.CO5	Design and develop text mining solutions using appropriate methodologies and tools to solve real-world problems across various domains.		

Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
TM.CO1	3	2	-	-	2	-	-	-	-	-	-	2	1
TM.CO2	2	3	2	2	3	-	-	-	-	-	-	3	2
TM.CO3	2	3	2	3	2	-	-	-	-	-	-	3	2
TM.CO4	2	2	1	3	2	-	-	-	-	-	-	2	3
TM.CO5	2	2	3	2	3	-	-	-	1	2	1	3	3
Average	2.2	2.4	1.6	2.0	2.4	0.0	0.0	0.0	0.2	0.4	0.2	2.6	2.2

Semester No:	VIII		
Course Title:	Professional Elective II Software Project Management, (SPM)	Course Code:	U23CD705
Course Outcome No.	Course Outcome Statement		
SPM.CO1	Analyze various project environments and propose suitable management strategies.		
SPM.CO2	Apply ethical principles to ensure responsible and professional software development.		
SPM.CO3	Explain and differentiate the major phases of the software project management life cycle.		
SPM.CO4	Evaluate the business context and scope to select an appropriate project management approach.		
SPM.CO5	Understand the concept of risk and construct critical questions that support decision-making.		

Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
SPM.CO1	3	3	2	2	2	1	-	-	2	2	3	3	2
SPM.CO2	2	2	2	1	1	2	1	3	1	2	2	3	3
SPM.CO3	3	3	3	3	2	1	-	-	2	2	2	3	3
SPM.CO4	3	3	3	3	3	2	1	1	2	3	3	3	3
SPM.CO5	3	3	3	3	3	2	1	1	2	3	3	2	3
Average	2.8	2.8	2.6	2.4	2.2	1.6	0.6	1.0	1.8	2.4	2.6	2.8	2.8

Semester No:	VIII		
Course Title:	Open Elective-III Internet of Things, (IoT)	Course Code:	U23EC711
Course Outcome No.	Course Outcome Statement		
IoT.CO1	Explain the fundamentals, architecture, characteristics, communication protocols, and functional blocks of the Internet of Things.		
IoT.CO2	Interpret the working principles, characteristics, and applications of various sensors used in IoT systems.		
IoT.CO3	Analyse IoT platforms, devices, and development environments such as Raspberry Pi, Arduino, AWS, RFID, and related technologies.		
IoT.CO4	Apply interfacing techniques, communication protocols, cloud interfaces, and IoT platforms for designing IoT-based applications.		

IoT.CO5	Evaluate domain-specific IoT applications and case studies in smart homes, smart cities, healthcare, agriculture, energy, industry, environment, and logistics.
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Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
IoT.CO1	3	2	1	-	1	-	-	-	-	-	1	2	1
IoT.CO2	3	3	2	-	2	-	-	-	-	-	1	2	3
IoT.CO3	3	3	2	2	2	-	-	-	-	-	1	2	3
IoT.CO4	3	3	3	2	3	1	1	-	-	-	2	3	3
IoT.CO5	3	2	2	1	2	2	2	-	-	-	2	3	2
Average	3.0	2.6	2.0	1.0	2.0	0.6	0.6	0.0	0.0	0.0	1.4	2.4	2.4

Semester No:	VII		
Course Title:	Cloud Computing Lab, (CC Lab)	Course Code:	U23CD7L1
Course Outcome No.	Course Outcome Statement		
CC Lab.CO1	Explain cloud computing concepts such as virtualization, scalability, and resource pooling, and interpret their role in modern computing.		
CC Lab.CO2	Apply virtualization principles to create and manage virtual machines using VirtualBox.		
CC Lab.CO3	Implement C programming fundamentals including syntax, data types, control structures, functions, and memory management.		

CC Lab.CO4	Design, develop, test, and deploy a C-based application in a virtualized cloud environment.
CC Lab.CO5	Collaborate effectively in laboratory and project activities and document technical work clearly for future use.

Course Articulation Matrix:

Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CC Lab.CO1	3	2	2	-	-	-	-	-	-	-	-	3	2
CC Lab.CO2	3	3	2	2	-	-	-	-	-	-	-	3	3
CC Lab.CO3	3	3	3	2	-	-	-	-	-	-	-	3	3
CC Lab.CO4	3	3	3	3	1	-	-	-	-	-	-	3	3
CC Lab.CO5	3	3	3	2	2	-	-	-	-	-	-	3	3
Average	3.0	2.8	2.6	2.2	1.0	-	-	-	-	-	-	3.0	2.8

Course Articulation Matrix:

Mapping of Course Outcomes (CO) with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

Course Outcomes (CO's)	Program Outcomes (PO)											Program Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
Major Proj.CO1	3	2	2	1	2	1	1	2	2	1	1	3	2
Major Proj.CO2	2	3	3	3	3	3	2	2	3	3	2	3	3
Major Proj.CO3	3	3	3	2	3	2	2	3	3	3	2	3	3
Major Proj.CO4	3	2	3	2	3	2	2	3	3	3	2	3	3
Major Proj.CO5	2	1	3	1	1	2	3	3	3	3	1	2	2
Average	2.6	2.2	2.6	1.8	2.4	2	2	2.6	2.6	2.2	1.8	2.8	2.6

