LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY

(UGC Autonomous)

Approved by AICTE | Affiliated to Osmania University | Estd.2003.

DEPARTMENT OF CSE-DATA SCIENCE

Course Outcomes & Course Articulation Matrix

ACADEMIC YEAR: 2025-26

Semester No:	IV		
Course Title:	Operating Systems, (OS)	**Course Code:**	**U24CD401**
Course Outcome No.	**Course Outcome Statement**		
OS.CO1	Define the core components, services, and architectural structures of modern operating systems.		
OS.CO2	Apply process scheduling algorithms and deadlock handling techniques to manage system resources.		
OS.CO3	Analyze memory and storage-management techniques to assess their effectiveness in optimizing system performance.		
OS.CO4	Evaluate the organization of file systems and the mapping of logical structures to physical storage devices.		
OS.CO5	Differentiate system protection, security mechanisms and the principles of secure operating system design.		

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**
OS.**CO1**	3	1	–	–	1	–	–	–	–	–	1	2	1
OS.**CO2**	3	3	2	–	2	–	–	–	–	–	1	2	3
OS.**CO3**	3	3	–	2	2	–	–	–	–	–	1	2	3
OS.**CO4**	3	2	2	–	2	–	–	–	–	–	1	2	2
OS.**CO5**	3	2	2	–	1	1	2	–	–	–	2	3	2
Average	3	2.2	2.0	2.0	1.6	1.0	2.0	0.0	0.0	0.0	1.2	2.2	2.2

Semester No:	IV		
Course Title:	Java Programming, (JP)	Course Code:	U24IT402
Course Outcome No.	**Course Outcome Statement**		
JP.CO1	Familiarization of OOP concepts and basics of java programming.		
JP.CO2	Describe the concept of interfaces and inheritance, how to solve real world problems		
JP.CO3	Choose a suitable package to develop the inter process communication using multithreading.		
JP.CO4	Build GUI applications using AWT and Swings.		
JP.CO5	Describe the connectivity to database and java programming using JDBC Connectivity.		

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
JP.CO1	3	3	3	3	2	–	–	–	–	–	2	2	2
JP.CO2	3	3	3	3	2	–	–	–	–	–	2	2	2
JP.CO3	3	3	3	3	2	–	–	–	–	–	2	2	2
JP.CO4	3	3	3	3	2	–	–	–	–	–	2	2	2
JP.CO5	3	3	3	3	2	–	–	–	–	–	2	2	2
Average	3.0	3.0	3.0	3.0	2.0	_	_	_	_	_	2.0	2.0	2.0

Semester No:	IV		
Course Title:	Operations Research, (OR)	**Course Code:**	**U24ME404**
Course Outcome No.	**Course Outcome Statement**		
OR.CO1	Understand the ideas of mathematical induction to recursion and recursively defined structures.		
OR.CO2	Prepare the students to have the knowledge of Linear Programming Problem in Operations.		
OR.CO3	Research at the end students would be able to understand the concept and develop the models for different applications.		
OR.CO4	Make students understand the concept Replacement models at the end students would able to explain various features and applications of replacement models in real time scenario.		
OR.CO5	Prepare the students to understand theory of Game in operations research at the end students would able to explain application of Game theory in decision making for a conflict.		

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**
OR.CO1	3	3	3	3	2	–	–	–	–	–	2	2	2
OR.CO2	3	3	3	3	2	–	–	–	–	–	2	2	2
OR.CO3	3	3	3	3	2	–	–	–	–	–	2	2	2
OR.CO4	3	3	3	3	2	–	–	–	–	–	2	2	2
OR.CO5	3	3	3	3	2	–	–	–	–	–	2	2	2
Average	**3.0**	**3.0**	**3.0**	**3.0**	**2.0**	**_**	**_**	**_**	**_**	**_**	**2.0**	**2.0**	**2.0**

Semester No:	IV		
Course Title:	Design and Analysis of Algorithms, (DAA)	**Course Code:**	**U24CS401**
Course Outcome No.	**Course Outcome Statement**		
DAA.CO1	Demonstrate the use of Asymptotic notations to find the efficiency of Algorithms.		
DAA.CO2	Apply Divide-and-Conquer, Transform-and-Conquer and Decrease and Conquer to Solve Real World Problem.		
DAA.CO3	Apply Greedy Approach problem solving Techniques to solve real world problems.		
DAA.CO4	Apply Dynamic Programming problem solving Techniques to solve real world problems.		
DAA.CO5	Apply and Analyze Backtracking and Branch and Bound approaches for solving real world problems and Distinguish P and NP 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**
DAA.CO1	3	2	1	–	–	–	–	–	–	–	–	3	2
DAA.CO2	3	3	2	2	1	–	–	–	–	–	–	3	3
DAA.CO3	3	3	2	2	–	–	–	–	–	–	–	3	2
DAA.CO4	3	3	3	2	1	–	–	–	–	–	–	3	3
DAA.CO5	3	3	3	3	–	–	–	–	–	–	–	3	3
Average	**3.0**	**2.8**	**2.2**	**2.2**	**1.0**	**–**	**–**	**–**	**–**	**–**	**–**	**3.0**	**2.6**

Semester No:	IV		
Course Title:	Mathematics – III (Mathematics for Data Science), (MIII)	**Course Code:**	**U24MA402**

Course Outcome No.	Course Outcome Statement
MIII.CO1	Compute and interpret descriptive statistics.
MIII.CO2	Evaluate random processes which occur in engineering applications governed by the Binomial, Poisson, Normal and Exponential distributions.
MIII.CO3	Apply Inferential Statistics to make predictions or judgments about the population from which the sample data is drawn.
MIII.CO4	Analyze and check the validity of statement using testing of hypothesis for various parameters and ANOVA technique.
MIII.CO5	Interpret Time series data.

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**
MIII.CO1	3	3	3	3	2	-	-	-	-	-	-	2	2
MIII.CO2	3	3	3	3	2	-	-	-	-	-	-	2	2
MIII.CO3	3	3	3	3	2	-	-	-	-	-	-	2	2
MIII.CO4	3	3	3	3	2	-	-	-	-	-	-	2	2
MIII.CO5	3	3	3	3	2	-	-	-	-	-	-	2	2
Average	**3.0**	**3.0**	**3.0**	**3.0**	**2.0**	**-**	**-**	**-**	**-**	**-**	**-**	**2.0**	**2.0**

Semester No:	IV		
Course Title:	English for Technical Communication, (ETC)	**Course Code:**	**U24EN401**
Course Outcome No.	**Course Outcome Statement**		
ETC.CO1	Apply technical communication skills effectively.		
ETC.CO2	Adapt different types of official correspondence successfully.		
ETC.CO3	Construct report writing productively using various techniques.		
ETC.CO4	Develop the skills of manual writing adequately.		
ETC.CO5	Interpret the information transfer from verbal to non-verbal data and vice-versa completely		

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**
ETC.CO1	3	2	1	–	–	–	–	–	–	2	–	3	2
ETC.CO2	3	2	2	1	–	–	–	–	–	2	–	3	2
ETC.CO3	3	2	2	2	–	–	–	–	–	2	–	3	2
ETC.CO4	3	2	2	2	–	–	–	–	–	1	–	2	2
ETC.CO5	3	2	2	1	–	–	–	–	–	2	–	2	2
Average	**3.0**	**2.0**	**1.8**	**1.5**	**–**	**–**	**–**	**–**	**–**	**1.8**	**–**	**2.6**	**2.0**

Semester No:	IV		
Course Title:	Operating Systems Lab, (OS Lab)	**Course Code:**	**U24CD4L1**
Course Outcome No.	**Course Outcome Statement**		
OS Lab.CO1	Apply Linux commands and system calls to manage files, processes, and system resources effectively.		
OS Lab.CO2	Implement inter-process communication and synchronization mechanisms to coordinate concurrent processes.		
OS Lab.CO3	Analyze and compare CPU scheduling, disk scheduling, and page replacement algorithms for performance evaluation.		
OS Lab.CO4	Apply deadlock handling techniques including prevention and avoidance using Banker's algorithm.		
OS Lab.CO5	Design and implement classical operating system problems to demonstrate resource management and concurrency control.		

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**
OS Lab.CO1	3	1	–	–	1	–	–	–	–	–	1	2	1
OS Lab.CO2	3	3	2	–	2	–	–	–	–	–	1	2	3
OS Lab.CO3	3	3	–	2	2	–	–	–	–	–	1	2	3
OS Lab.CO4	3	2	2	–	2	–	–	–	–	–	1	2	2
OS Lab.CO5	3	2	2	–	1	1	2	–	–	–	2	3	2
Average	**3**	**2.2**	**2.0**	**2.0**	**1.6**	**1.0**	**2.0**	**0.0**	**0.0**	**0.0**	**1.2**	**2.2**	**2.2**

Semester No:	IV		
Course Title:	Java Programming Lab, (JP Lab)	**Course Code:**	**U24IT4L2**
Course Outcome No.	**Course Outcome Statement**		
JP Lab.CO1	Develop Java applications using the concepts of Inheritance, interfaces, packages, access control specifies.		
JP Lab.CO2	Implement the concepts of Exception Handling in java Applications.		
JP Lab.CO3	Read and write data using different Java I/O streams.		
JP Lab.CO4	Create graphical user interfaces and Applets by applying the knowledge of Event Handling.		
JP Lab.CO5	Create robust applications using Java standard class libraries and retrieve data from a database with JDBC.		

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**
JP Lab.CO1	3	2	2	–	–	–	–	–	–	–	–	3	2
JP Lab.CO2	3	3	2	2	–	–	–	–	–	–	–	3	3
JP Lab.CO3	3	3	2	2	–	–	–	–	–	–	–	3	2
JP Lab.CO4	3	3	3	2	1	–	–	–	–	–	–	3	3
JP Lab.CO5	3	3	3	3	1	–	–	–	–	–	–	3	3
Average	**3.0**	**2.8**	**2.4**	**2.2**	**0.7**	**–**	**–**	**–**	**–**	**–**	**–**	**3.0**	**2.6**

Semester No:	IV		
Course Title:	Soft Skills & Employability Skills Lab, (SS&ES Lab)	Course Code:	U24EN4L1

Course Outcome No.	Course Outcome Statement
SS&ES Lab.CO1	Apply soft skills at professional level.
SS&ES Lab.CO2	Foster leadership skill with a mature outlook for effective functioning at work front.
SS&ES Lab.CO3	Develop confidence through interpersonal skills.
SS&ES Lab.CO4	Exhibit their ability and skills to write Resume/CV and cover letter.
SS&ES Lab.CO5	Boost skills of group discussion and interview.

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
SS&ES Lab.CO1	3	2	2	–	–	–	–	–	–	–	–	3	2
SS&ES Lab.CO2	3	3	2	2	–	–	–	–	–	–	–	3	3
SS&ES Lab.CO3	3	3	2	2	–	–	–	–	–	–	–	3	2
SS&ES Lab.CO4	3	3	3	2	1	–	–	–	–	–	–	3	3
SS&ES Lab.CO5	3	3	3	3	1	–	–	–	–	–	–	3	3
Average	**3.0**	**2.8**	**2.4**	**2.2**	**0.7**	**–**	**–**	**–**	**–**	**–**	**–**	**3.0**	**2.6**

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DEPARTMENT OF CSE-DATA SCIENCE

Course Outcomes & Course Articulation Matrix

ACADEMIC YEAR: 2025-26

Semester No:	VI		
Course Title:	Data Engineering, (DE)	**Course Code:**	**U23CD601**
Course Outcome No.	**Course Outcome Statement**		
DE.CO1	Demonstrate the Data Engineering lifecycle and Ecosystems.		
DE.CO2	Illustrate the python libraries and tools to perform ETL process.		
DE.CO3	Apply different data storage and retrieval systems. (SQL,NoSQL,file formats)		
DE.CO4	Analyze and deploy end to end data pipeline using python.		
DE.CO5	Categorize, monitor and debug data pipeline 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**
DE.**CO1**	3	3	2	1	3	-	-	-	-	-	-	3	3
DE.**CO2**	2	3	-	2	2	-	-	-	-	-	2	3	2
DE.**CO3**	3	2	2	2	-	-	-	-	-	-	2	3	3
DE.**CO4**	3	3	3	2	2	-	-	-	-	-	-	2	3
DE.**CO5**	2	3	1	3	1	-	-	-	-	-	-	2	2
Average	**2.6**	**2.8**	**2.0**	**2.0**	**2.0**	-	-	-	-	-	**2.0**	**2.6**	**2.6**

Semester No:	VI		
Course Title:	Machine Learning, (ML)	**Course Code:**	**U23CM602**
Course Outcome No.	**Course Outcome Statement**		
ML.CO1	To introduce students to the basic concepts of Data Science and techniques of Machine Learning.		
ML.CO2	To develop skills of using recent machine learning software for solving practical problems.		
ML.CO3	To gain experience of doing independent study and research.		
ML.CO4	To develop an understanding of the role of machine learning in massive scale automation.		
ML.CO5	To design and implement various machine learning algorithms in the range of real world applications		

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**
ML.**CO1**	3	3	2	–	3	–	–	–	–	–	2	3	2
ML.**CO2**	2	2	3	–	2	–	–	–	–	–	3	2	3
ML.**CO3**	3	2	3	–	2	–	–	–	–	–	2	3	2
ML.**CO4**	2	3	2	–	3	–	–	–	–	–	3	2	2
ML.**CO5**	3	2	3	–	2	–	–	–	–	–	3	3	3
Average	2.6	2.4	2.6	–	2.4	–	–	–	–	–	2.6	2.6	2.4

Semester No:	VI		
Course Title:	Business Economics and Financial Analysis, (BEFA)	**Course Code:**	**U23MB601**
Course Outcome No.	**Course Outcome Statement**		
BEFA.CO1	Apply the concepts of business and economics during his/her professional and personal life.		
BEFA.CO2	Understand the elasticity of the demand of the product, different types, and measurement of elasticity of demand and factors influencing on elasticity of demand.		
BEFA.CO3	Recognize the Production function, features of Iso-Quants and Iso-Costs, different types of internal economies, external economies and law of returns with appropriate examples.		
BEFA.CO4	Prepare the financial statements of the firm.		
BEFA.CO5	Analyze the financial statements using ratio analysis and cash flow 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**
BEFA.**CO1**	3	2	2	–	–	–	–	–	–	–	–	3	2
BEFA.**CO2**	3	3	2	2	–	–	–	–	–	–	–	3	3
BEFA.**CO3**	3	3	3	2	–	–	–	–	–	–	–	3	3
BEFA.**CO4**	3	3	3	3	1	–	–	–	–	–	–	3	3
BEFA.**CO5**	3	3	3	3	1	–	–	–	–	–	–	3	3
Average	**3.0**	**2.8**	**2.6**	**2.5**	**0.7**	**–**	**–**	**–**	**–**	**–**	**–**	**3.0**	**2.8**

Semester No:	VI		
Course Title:	Professional Elective-II Natural Language Processing, (PECNLP)	**Course Code:**	**U23CD604**

Course Outcome No.	**Course Outcome Statement**
NLP.CO1	Apply linguistic methods to tag a given text with essential language features.
NLP.CO2	Design an innovative NLP-based application by integrating appropriate NLP components.
NLP.CO3	Evaluate and implement rule-based models to address morphological and syntactic processing of a language.
NLP.CO4	Create an effective tag-set suitable for statistical NLP processing in real-time applications.
NLP.CO5	Analyse and compare statistical approaches for diverse NLP tasks and perform phonetic analysis.

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**
NLP.**CO1**	3	2	2	–	1	–	–	–	–	–	3	3	2
NLP.**CO2**	3	3	3	–	2	–	–	–	–	–	2	3	3
NLP.**CO3**	2	3	3	–	2	–	–	–	–	–	3	2	3
NLP.**CO4**	2	2	3	–	3	–	–	–	–	–	2	3	2
NLP.**CO5**	3	2	2	–	2	–	–	–	–	–	3	3	3
Average	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6

Semester No:	VI		
Course Title:	Open Elective-IIPrinciples of Data Communications and Computer Networks, (DCCN)	**Course Code:**	**U23EC609**
Course Outcome No.	**Course Outcome Statement**		
DCCN.CO1	Understand the categories and functions of various data communication networks.		
DCCN.CO2	Design and analyze different error detection techniques.		
DCCN.CO3	Explain the mechanisms involved in routing data at the network layer.		
DCCN.CO4	Understand the importance of various flow control and congestion control mechanisms.		
DCCN.CO5	Explain the functioning of different application layer 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**	**PSO2**
DCCN.**CO1**	3	2	1	1	2	-	-	-	-	1	-	-
DCCN.**CO2**	3	2	2	3	2	-	-	-	-	1	-	-
DCCN.**CO3**	3	3	3	2	3	-	-	-	-	1	-	-
DCCN.**CO4**	3	3	3	3	3	-	-	-	-	1	-	-
DCCN.**CO5**	2	2	2	2	3	-	-	-	-	1	-	-
Average	**2.8**	**2.4**	**2.2**	**2.2**	**2.6**	**-**	**-**	**-**	**-**	**1**	**-**	**-**

Semester No:	VI		
Course Title:	Data Engineering Lab, (DE Lab)	**Course Code:**	**U23CD6L1**
Course Outcome No.	**Course Outcome Statement**		
DE Lab.CO1	Explain the data engineering lifecycle, ecosystem, and the role of data ingestion, storage, processing, and analytics in real-world applications.		
DE Lab.CO2	Develop Python programs to ingest, parse, clean, and transform structured and unstructured data from multiple sources such as text, CSV, HTML, XML, JSON, and binary files.		
DE Lab.CO3	Design and implement data storage solutions using relational (SQL) and non-relational (NoSQL) databases, and perform CRUD and aggregation operations effectively.		
DE Lab.CO4	Apply Python libraries such as NumPy and Pandas to perform data manipulation, data wrangling, analysis, and visualization for large datasets.		
DE Lab.CO5	Build, deploy, monitor, and optimize end-to-end data pipelines using Python, ensuring data quality, performance, and error handling.		

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**
DE Lab.**CO1**	3	2	2	–	–	–	–	–	–	–	–	3	2
DE Lab.**CO2**	3	3	2	2	–	–	–	–	–	–	–	3	3
DE Lab.**CO3**	3	3	3	2	–	–	–	–	–	–	–	3	3
DE Lab.**CO4**	3	3	3	3	1	–	–	–	–	–	–	3	3
DE Lab.**CO5**	3	3	3	3	1	–	–	–	–	–	–	3	3
Average	**3.0**	**2.8**	**2.6**	**2.5**	**0.7**	**–**	**–**	**–**	**–**	**–**	**–**	**3.0**	**2.8**

Semester No:	VI		
Course Title:	Machine Learning Lab, (ML Lab)	**Course Code:**	**U23CM6L2**

Course Outcome No.	Course Outcome Statement
ML Lab.CO1	Define and explain fundamental concepts and terminology of machine learning, including classification and regression techniques.
ML Lab.CO2	Explain and compare the complexity, assumptions, and limitations of commonly used machine learning algorithms.
ML Lab.CO3	Implement appropriate machine learning algorithms to solve real-world problems involving classification and regression.
ML Lab.CO4	Conduct experiments on real-world datasets and analyse the outcomes of different machine learning algorithms.
ML Lab.CO5	Evaluate the performance of machine learning models using standard metrics such as accuracy, precision, recall, and F1-score.

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**
ML Lab.**CO1**	3	2	2	–	2	–	–	–	–	–	3	3	2
ML Lab.**CO2**	2	3	2	–	2	–	–	–	–	–	3	2	3
ML Lab.**CO3**	3	2	3	–	3	–	–	–	–	–	2	3	2
ML Lab.**CO4**	2	3	3	–	3	–	–	–	–	–	3	2	3
ML Lab.**CO5**	3	2	3	–	2	–	–	–	–	–	3	3	3
Average	2.6	2.4	2.6	–	2.4	–	–	–	–	–	2.8	2.6	2.6

Semester No:	VI		
Course Title:	Mini Project, ()	**Course Code:**	**U23CD6P1**
Course Outcome No.	**Course Outcome Statement**		
Mini Prj.CO1	Identify and formulate a well-defined problem by applying domain knowledge and literature survey.		
Mini Prj.CO2	Design and develop appropriate theoretical, experimental, or numerical models to address the identified problem.		
Mini Prj.CO3	Apply suitable tools, techniques, and methodologies to implement the proposed solution effectively.		
Mini Prj.CO4	Analyze, interpret, and correlate the obtained results to draw meaningful conclusions based on technical and economic feasibility.		
Mini Prj.CO5	Document the mini project work systematically in a standard technical format and present the outcomes effectively as a team.		

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**
Mini Prj.**CO1**	3	3	2	2	–	1	–	–	1	–	1	2	1
Mini Prj.**CO2**	2	3	3	2	2	1	–	–	1	–	1	3	2
Mini Prj.**CO3**	2	2	3	3	3	1	–	–	1	–	1	3	2
Mini Prj.**CO4**	2	3	2	3	2	2	–	–	1	1	1	2	2
Mini Prj.**CO5**	1	2	2	1	2	2	2	3	3	2	2	2	3
Average	**2**	**2.6**	**2.4**	**2.2**	**2.2**	**1.4**	**2**	**3**	**1.4**	**1.5**	**1.2**	**2.4**	**2**

Semester No:	VI		
Course Title:	Aptitude and Reasoning Skills Lab, (A&R)	**Course Code:**	**U23MA6L1**
Course Outcome No.	**Course Outcome Statement**		
A&R.CO1	Build proficiency in quantitative reasoning.		
A&R.CO2	Improve critical thinking skills.		
A&R.CO3	Enhance analytical skills.		
A&R.CO4	Demonstrate quantitative aptitude concepts.		
A&R.CO5	Adapt principles of quantitative aptitude to achieve qualitative results.		

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**
A&R.**CO1**	3	2	2	–	–	–	–	–	–	–	–	3	2
A&R.**CO2**	3	3	2	2	–	–	–	–	–	–	–	3	3
A&R.**CO3**	3	3	3	2	–	–	–	–	–	–	–	3	3
A&R.**CO4**	3	3	3	3	1	–	–	–	–	–	–	3	3
A&R.**CO5**	3	3	3	3	1	–	–	–	–	–	–	3	3
Average	**3.0**	**2.8**	**2.6**	**2.5**	**0.7**	**–**	**–**	**–**	**–**	**–**	**–**	**3.0**	**2.8**

LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY

(UGC Autonomous)

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DEPARTMENT OF CSE-DATA SCIENCE

Course Outcomes & Course Articulation Matrix

ACADEMIC YEAR: 2025-26

Semester No:	VIII		
Course Title:	Natural Language Processing, (NLP)	**Course Code:**	**U21CD801**
Course Outcome No.	**Course Outcome Statement**		
NLP.CO1	Apply linguistic methods to tag a given text with essential language features.		
NLP.CO2	Design an innovative NLP-based application by integrating appropriate NLP components.		
NLP.CO3	Evaluate and implement rule-based models to address morphological and syntactic processing of a language.		
NLP.CO4	Create an effective tag-set suitable for statistical NLP processing in real-time applications.		
NLP.CO5	Analyse and compare statistical approaches for diverse NLP tasks and perform phonetic analysis.		

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**
NLP.**CO1**	3	2	2	–	1	–	–	–	–	–	3	3	2
NLP.**CO2**	3	3	3	–	2	–	–	–	–	–	2	3	3
NLP.**CO3**	2	3	3	–	2	–	–	–	–	–	3	2	3
NLP.**CO4**	2	2	3	–	3	–	–	–	–	–	2	3	2
NLP.**CO5**	3	2	2	–	2	–	–	–	–	–	3	3	3
Average	2.6	2.4	2.6	2.0	2.6	–	–	–	–	–	2.6	2.8	2.6

Semester No:	VIII		
Course Title:	Optimization Techniques, Professional Elective V, (OT)	**Course Code:**	**U21CD802**
Course Outcome No.	**Course Outcome Statement**		
OT.CO1	Apply operations research techniques such as linear programming to solve industrial optimization problems.		
OT.CO2	Explain and analyse the theory of games to solve simple decision-making scenarios.		
OT.CO3	Use linear programming methods to formulate and solve shortest route problems.		
OT.CO4	Construct project networks and determine critical path and total project duration using CPM/PERT.		
OT.CO5	Evaluate various OR tools to support effective business 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**
OT.**CO1**	3	2	3	–	2	–	–	–	–	–	2	3	2
OT.**CO2**	2	3	2	–	2	–	–	–	–	–	2	2	2
OT.**CO3**	3	2	3	–	3	–	–	–	–	–	2	3	2
OT.**CO4**	2	3	3	–	3	–	–	–	–	–	3	2	3
OT.**CO5**	3	2	2	–	2	–	–	–	–	–	3	3	3
Average	2.6	2.4	2.6	–	2.4	–	–	–	–	–	2.4	2.6	2.4

Semester No:	VIII		
Course Title:	Entrepreneurship, Open Elective IV, ()	**Course Code:**	**U21MB802**
Course Outcome No.	**Course Outcome Statement**		
Ent.CO1	Discern the cues and motives behind entrepreneurship.		
Ent.CO2	Inspire and motivate students to engage in entrepreneurship.		
Ent.CO3	Educate students about entrepreneurial environment.		
Ent.CO4	Provide training in the creation of a business plan.		
Ent.CO5	Foster the development of an entrepreneurial mindset in students.		

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**
Ent.**CO1**	3	2	2	–	–	–	–	–	–	–	–	3	2
Ent.**CO2**	3	3	2	2	–	–	–	–	–	–	–	3	3
Ent.**CO3**	3	3	3	2	–	–	–	–	–	–	–	3	3
Ent.**CO4**	3	3	3	3	1	–	–	–	–	–	–	3	3
Ent.**CO5**	3	3	2	1	-	-	-	-	-	-	–	3	3
Average	**3.0**	**2.8**	**2.5**	**2.3**	**0.3**	**–**	**–**	**–**	**–**	**–**	**–**	**3.0**	**2.8**

Semester No:	VIII		
Course Title:	Cloud Computing Lab, (CC Lab)	**Course Code:**	U21CD8L1
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**

Semester No:	VIII		
Course Title:	Major Project, ()	**Course Code:**	U21CD8P1
Course Outcome No.	**Course Outcome Statement**		
Major Proj.CO1	Demonstrate sound technical knowledge of the selected project topic.		
Major Proj.CO2	Conduct investigations using research-based methods to draw valid conclusions.		
Major Proj.CO3	Apply engineering knowledge to solve complex societal problems, individually or in teams.		
Major Proj.CO4	Select and utilize modern tools to address limitations in engineering solutions.		
Major Proj.CO5	Communicate effectively with engineering experts and the community in written and oral forms, and publish research in recognized forums (UGC journals, conferences).		

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**