ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR

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B. Tech. Scheme of Examination & Syllabus 2024-25

ARTIFICIAL INTELLIGENCE

FOURTH SEMESTER

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total	No of Hours of ESE
1.	PCC	**24AI401T**	Numerical Methods and Optimization	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**3**
2.	PCC	**24AI402T**	Design and Analysis of Algorithms	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**3**
3.	PCC	**24AI402P**	Design and Analysis of Algorithms Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**-**
4.	PCC	**24AI403P**	Object Oriented Programming Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**-**
5.	PCC	**24AI404P**	Web Programming for AI Lab	**--**	**-**	**4**	**2**	**-**	**25**	**25**	**50**	**-**
6.	VSC	**24AI406P**	Technical Skill Development - I	**-**	**-**	**4**	**2**	**-**	**50**	**-**	**50**	**-**
7.	AEC	**24AI405T**	Economics and Management	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**3**
8.	SEC	**24AI441P**	Career Development - IV	**-**	**-**	**2**	**1**	**-**	**50**	**-**	**50**	**-**
9.	ELC	**24AI407P**	Micro Project II*	**-**	**-**	**2**	**1**	**-**	**50**	**-**	**50**	**-**
10.	MDM	**24AI431M**	Multidisciplinary Minor - II	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**3**
			Total	**12**	**0**	**16**	**20**	**80**	**305**	**315**	**700**	**-**

*** Field Project or Community engagement project in the major discipline**

MDM II	**24AI431M**	**Data Centric AI**

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ARTIFICIAL INTELLIGENCE

ARISE & SHINE

FOURTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits		Evaluation		
						MSE	CA	ESE	Total
24AI401T	Numerical Methods and Optimization	3	--	--	3	20	20	60	100

Course Objectives	Course Outcomes
The goal of this paper is to 1. To equip students with the mathematical, algorithmic, and computational foundations of numerical methods and optimization so they can model real-world AI problems, analyze errors and stability, and implement efficient, reliable optimization algorithms that power modern machine learning and data-driven decision systems.	**Students will be able to** 1. Differentiate and analyze various types of errors and solve equations accurately. 2. Apply numerical computational methods to solve practical problems effectively. 3. Interpret and employ numerical methods to model and solve physical and engineering phenomena. 4. Formulate basic optimization problems and solve them using graphical and simplex methods. 5. Evaluate hypotheses by applying statistical analysis techniques for hypothesis testing.

Unit I: Numerical methods for roots of equations	**[7 Hrs]**
Errors & Types of Errors, Theory of Equations, Solution of Algebraic & Transcendental equations: Bisection, False Position, Newton-Raphson methods (only formulae), Problems.	
Unit II: Numerical methods for system of equations	**[8 Hrs]**
Solution of Simultaneous Equations: Gauss Elimination, Gauss Seidel, Factorization method. Iterative method for finding Largest Eigen value & Eigen vector.	
Unit III: Numerical Solution of Ordinary Differential Equations	**[10 Hrs]**
Numerical Solution of Ordinary Differential Equations for first order & first degree: Taylor's Series method, Euler's Modified method, Runge – Kutta method of fourth order, Milne's Predictor Corrector method (No derivation of formulae), solution of 2^{nd} order Differential Equation by Runge – Kutta method.	
Unit IV: Linear Programming and Transportation Models	**[10 Hrs]**
Linear programming problem: Formulation, Graphical method, Simplex method, Transportation & Assignment Problems and its simple applications.	
Unit V: Testing of Hypothesis	**[10 Hrs]**
Hypothesis, Null hypothesis, Alternative hypothesis, Testing a hypothesis, Level of significance, Confidence limits, Test of significance of difference of means, t-test, F-test and Chi-square test. One way and two-way Analysis of Variance (ANOVA).	

Text Books

S.N	Title	Authors	Edition	Publisher
1	. Advanced Engineering Mathematics	H. K. Dass		S. Chand
2	Numerical Methods	Dr. P. Kandasamy, Dr. K Thilagavathy, Dr. K. Gunavathy		S. Chand
3	Fundamental of Statistics	S.C Gupta		Himalaya Publication

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Probability and Statistics	Murray Spiegel, John Schiller, R. A. Srinivasan	4th Edition, 2016	Schaum's Outline Series
2	Higher Engineering Mathematics	B. V. Ramana		Tata McGraw-Hill

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ARTIFICIAL INTELLIGENCE

FOURTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
24AI402T	Design and analysis of Algorithms	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
This course is intended to 1. Analyze the asymptotic performance of algorithm 2. Apply important algorithmic design paradigms and methods of analysis 3. Solve simple to moderately difficult algorithmic problems arising in applications 4. Able to demonstrate the hardness of simple NP-complete problems	**Students will be able to** 1. Illustrate different approaches for analysis and design of efficient algorithms and Analyze performance of various algorithms using asymptotic notations. 2. Determine and apply various divide & conquer strategies and greedy approaches for solving a given computational problem 3. Demonstrate and solve various real time problems using the concepts of dynamic programming 4. Make use of backtracking and traversal techniques for solving real-world problems 5. Explain P, NP, NP-hard, NP-complete problems and Cook's Theorem and analyze parallel algorithm structures, models, and performance

Unit I: Introduction **[9Hrs]**
Definition of algorithm and brief explanation about the basic properties of algorithms, Analysis of algorithms, Asymptotic notations, Amortized analysis, Recurrence relations, Bitonic sorting network.
Unit II: Greedy and Divide & Conquer Approach **[10Hrs]**
Divide and conquer strategies: Binary search, Stressen's matrix multiplication algorithm, min-max algorithm. Greedy Approach: Job sequencing with deadlines problem, knapsack problem, optimal merge pattern, Huffman code, minimum cost spanning tree using Prim's and Kruskal's algorithm, Dijkstra's Shortest Path Algorithm.
Unit III: Dynamic Programming **[10Hrs]**
Dynamic Programming: Basic Strategy, Multistage graph (forward and backward approach), Longest Common Subsequence, Optimal Binary Search Tree, 0/1 Knapsack problems, Travelling Salesman problem, single source shortest path algorithms.
Unit IV: Traversal Techniques and Backtracking **[9Hrs]**
Basic Traversal Techniques: Breadth first search and depth first search. Backtracking: Basic strategy, N-Queen Problem and their Analysis (4 & 8-Queen), graph coloring, Hamiltonian cycles.
Unit V: Computational Complexity & Parallel Algorithm **[7Hrs]**
Basic concepts: - P, NP, NP-hard and NP-complete problems, Cook's theorem, Parallel Algorithm: - Introduction, Parallel Algorithm structure, Analysis, Parallel Algorithm – Models.

Text Books

Sr. No.	Title	Authors	Edition	Publisher
1.	Introduction to Algorithms	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein	3rd	Prentice Hall of India
2.	The Design and Analysis of Computer Algorithms	Alfred V. Aho, John E. Hopcraft, Jeffrey D. Ullman	1st	Pearson education
3.	Fundamentals of Computer Algorithms	Horowitz, Sahani, Rajsekharam	2nd	University Press

Reference Books

Sr. No.	Title	Authors	Edition	Publisher
1.	Fundamentals of Algorithms	Brassard, Bratley	1st	Prentice Hall
2.	Design and Analysis of Algorithms	Parag Dave, Himanshu Dave	2nd	Pearson education

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FOURTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
24AI402P	Design and analysis of Algorithms Lab	-	-	2	1	-	25	25	50

Course Objectives	Course Outcomes
This course is intended 1. Develop the ability to analyze time and space complexity of algorithms through experimental evaluation. 2. Understand algorithmic paradigms such as divide & conquer, greedy methods, dynamic programming, graph algorithms, and backtracking through hands-on implementation. 3. Introduce students to NP-hard and NP-complete problems, fostering the ability to identify the complexity of computational tasks.	**Students will be able to·** 1. Analyze the time and space complexity of algorithms using asymptotic notations. 2. Apply divide & conquer and greedy strategies to solve computational problems. 3. Develop solutions for optimization problems using dynamic programming techniques. 4. Implement backtracking and graph traversal algorithms for real-world scenarios. 5. Classify NP-hard and NP-complete problems based on their computational characteristics.

Expt. No.	Title of the experiment
1	Implement a program to perform analysis of Binary search algorithm.
2	Implement a code to Find Minimum Cost Spanning Tree of undirected graph.
3	Implement Dijkstra's algorithm for the Single source shortest path problem.
4	Implement 0/1 Knapsack problem using Dynamic Programming.
5	Implement Traveling Salesperson problem to find the optimal solution.
6	Implement a backtracking algorithm for the N-queens Problem.
7	Implement the BFS and DFS traversal algorithms.
8	Implement a program for any parallel algorithm.
9	Micro project based on the syllabus of DDA course.

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Fundamentals of Algorithms	Brassard, Bratley	First	Prentice Hall
2	Design and Analysis of Algorithms	Parag Dave, Himanshu Dave	Second	Pearson Education

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Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
24AI403P	Object Oriented Programming Lab	-	-	2	1	-	25	25	50

Course Objectives	Course Outcomes
This course is intended to 1. To strengthen problem solving ability by using the characteristics of an object-oriented approach. 2. To design applications using object oriented features	**Students will be able to** 1. Articulate the principles of object-oriented programming using C++ 2. Learn function overloading, constructor overloading, operator overloading, polymorphism & its uses in programming. 3. Implement inheritance concepts and its use for application development. 4. Analyze of dynamic memory allocation and its use for software development 5. Implement concept of file handling in real life problems & implement a project for real world problems

Expt. No.	List of the experiment
1	Fundamental of constructs in C++ including Classes and Objects
2	Constructors and Destructors
3	Types of Overloading
4	Types of inheritance
5	Pointers and Inheritance
6	Virtual Functions
7	File streams
8	Micro project based on the Object-Oriented Programming concepts.

Reference Books

Sr. No.	Title	Authors	Edition	Publisher
1	Object –oriented Programing Using C++ and Java	Ramesh Vasappanavar, Anand Vasappanavar , Gautam Vasappanavar	1st Edition	PEARSON
2	Mastering C++	A.R.Venugopal, Rajkumar, T. Ravishanker	2nd Edition	TMH
3	Computer Science A Structured Approach Using C++	Behrouz A. Forouzan , Richard F. Gilberg	2nd Edition	CENGAGE Learning

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Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
24AI404P	Web Programming for AI Lab	-	-	4	2	-	25	25	50

Course Objectives	Course Outcomes
This course is intended to 1. Teach HTML/CSS fundamentals for building web layouts and navigation. 2. Train DOM manipulation and JavaScript event-handling skills. 3. Practice client-side form handling, validation, timers and date/time APIs. 4. Develop interactive UIs (chat, toggles, image events) using JS. 5. Introduce AI-enabled web tools and complete an end-to-end microproject.	**Students will be able to** 1. Build web pages with forms, navigation, and proper HTML layout. 2. Use DOM APIs and event handlers to create dynamic, interactive interfaces. 3. Implement client-side validation, timers, and date/time functionality. 4. Create a working chat-style UI and conditional recommendation logic. 5. Integrate an AI web tool and deliver a tested microproject demonstrating learned skills.

Expt. No.	List of the experiment
1	HTML Forms & DOM Manipulation
2	Form Handling & Conditional Logic
3	JavaScript Timers & Dynamic Styling
4	Chat UI Using DOM Appending
5	Working with Date and Time in JS
6	Client-Side Input Validation
7	Interactive Elements Using Toggle
8	Event Handling with Images
9	Conditional Recommendations (JS Logic)
10	HTML Layout & Website Navigation
11	Demonstration of various AI based web development tools
12	Micro project based on the Web Programming for AI concepts.

Reference Books

Sr. No.	Title	Authors	Edition	Publisher
1	Foundations of Web Programming	Ramesh R. Dutta	1st Edition	PHI Learning (Indian Author)
2	Web Programming: Building Internet Applications	Chris Bates	3rd Edition	Wiley
3	Learning Web Design: A Beginner's Guide to HTML, CSS, JS	Jennifer Robbins	5th Edition	O'Reilly Media

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Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
24AI406P	Technical Skill Development -I	-	-	4	2	-	50	-	50

Course Objectives	Course Outcomes
This course is intended 1. To develop advanced Python programming skills required for AI and data-driven applications. 2. To enable students to work with data analysis, visualization, and database operations using modern Python libraries. 3. To strengthen problem-solving abilities through project-based learning and industry-oriented coding practices.	**Students will be able to** 1. Apply advanced Python concepts, libraries, and object-oriented techniques in AI-related tasks. 2. Perform efficient data manipulation, visualization, and preprocessing using NumPy, Pandas, Matplotlib, and Seaborn. 3. Build and implement Python-based solutions for real-world problem statements, coding challenges, and mini-projects.

Module 1 Advanced Python Foundations	**[4 Hrs]**
Python data structures, list and dictionary operations, list comprehensions, generator expressions, iterators, functional programming with lambda–map–filter, Python execution model, namespaces, scope, memory model, Pythonic coding patterns, Buit-in Function and Built-in Libraries. Python Hands on based on Programming based questions.	
Module 2: NumPy, Pandas, and Data Manipulation	**[4 Hrs]**
NumPy arrays, indexing, slicing, broadcasting, vectorization, mathematical operations, Pandas Series and DataFrames, data cleaning, transformation, grouping, merging, exploratory data manipulation for Sample datasets using Open Repositories like UCI/Tensorflow.	
Module 3: Data Visualization with Matplotlib and Seaborn	**[4 Hrs]**
Plot creation with Matplotlib, line and bar charts, histograms, subplots, figure customization, Seaborn statistical plots, pair plots, heatmaps, distribution analysis, visualization for data patterns and AI insights.	
Module 4: Advanced Object-Oriented Programming	**[4 Hrs]**
Classes and objects, abstract classes, interfaces using ABC, multiple inheritance, MRO, mixins, property decorators, magic methods, operator overloading, class design patterns for scalable AI applications.	
Module 5: **Advanced Functions, Decorators, and Modules**	**[4 Hrs]**
Higher-order functions, closures, decorators, context managers, module creation, package structuring, virtual environments, dependency management, reusable AI-oriented module organization.	
Module 6: File Handling, Data Serialization and Databases	**[4 Hrs]**
Text and binary file operations, large dataset handling, buffered I/O, pathlib usage, JSON, CSV, XML, pickle formats, SQLite interaction, basic ORM workflows, dataset loading and preprocessing workflows.	
Module 7: **Module-Based Learning**	**[4 Hrs]]**
Hands-on Project based learning programming, discussing and implementing modules from problem statements, advance python questions asked in interviews and coding rounds	
Module 8: - Project based Learning	**[4 Hrs]**
Problem Statements taken from SIH and Hackathons for Practice	

Textbooks

Sr. No.	Title	Authors	Edition	Publisher
1	Python Programming: An Introduction to Computer Science	John Zelle	2nd Edition	Addison Wesley.
2	Learning Python	Mark Lutz	5th Edition	O'Reilly Media

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Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
24AI405T	Economics and Management	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
1. The course examines how the economics, business and industrial management practices are related and how business decision is taken.	**Students will be able to** 1. Apply managerial economics concept in business analysis and business decision making. 2. Explain relationships between production and costs and understand different forms of market structures. 3. Assess impact of macroeconomics and government policies on business and economy. 4. Recognize the functions of management and marketing management for business decisions. 5. Explore role of financial management in business and decision making.

Unit I:	**[9 Hrs]**
Economics, Classification of economics, Industrial economics, Consumer demand, Law of Demand, Determinants of demand, Demand forecasting, Law of supply, Utility, Law of diminishing marginal Utility, Types of Elasticity of demand	
Unit II:	**[9 Hrs]**
Concept of Production, Factors of Production, Laws of return, Cost concepts and types of cost, cost curves, Market Structures Perfect competition, Monopoly, Oligopoly, and Monopolistic competition.	
Unit III:	**[9 Hrs]**
The functions of central bank, Inflation, Deflation, Recession. Measures to control Inflation, National income, GDP, GNP. Liberalization, Privatization and Globalization	
Unit IV:	**[9 Hrs]**
Definition of management, functions of management – planning, organizing, directing, Controlling, Introduction to human resources Management, Marketing Management, Concepts of Marketing, Marketing mix, Methods of pricing, channels of distribution, advertising and sales promotion.	
Unit V:	**[9 Hrs]**
Financial Management, nature and scope of financial management, Sources of finance, Types of capital, Brief outline of profit and loss account, balance sheet, Budgets and types of budgets, Ratio analysis.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Managerial Economics	D.N. Dwivedi	8th	Vikas Publishing
2	Modern Economic Theory	K.K. Dewett	2005	S. Chand Publisher
3	Industrial Management	Dr.I.K. Chopde, Dr.A.M. Sheikh	Revised Edition	S. Chand Publisher

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Industrial Organization and Industrial economics	T.R. Banga, S.C. Sharma	2006	Khanna Publishers

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Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
24AI441P	Career Development – IV	-	-	2	01	50	-	50

Course Objectives	Course Outcomes
1. The sole objective of imparting aptitude training is to make students able to critically evaluate various real-life situations by resorting to an analysis of key issues and factors. 2. This Aptitude Training helps them to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions. 3. To categorize, apply and use thought process to distinguish between concepts of Quantitative methods.	1. Students shall understand the concepts of Quadratic Equation, AP, GP, and HP. 2. Students shall understand the concepts of Averages and Mixture and allegations 3. Students shall understand the concepts of Blood relation. 4. Students shall understand the concept of Dice and Cubes. 5. Students shall understand the concepts of clocks and Calendars.

Unit I	**[6Hrs]**
Aptitude : Quadratic Equation Arithmetic progression, Geometric progression, Harmonic progression Imax: Critical Thinking, Interview Simulation, Engineering Leadership, Spatial Reasoning	
Unit II	**[6Hrs]**
Aptitude : Average Mixture and Allegation Imax: Interactive Interview Training, Start-Up & Entrepreneurship,	
Unit III	**[6Hrs]**
Aptitude : Blood Relation :- Family Tree, Coding Blood Relation, Pointing to a Person Problem Imax: Engineering Ethics, Employability, Engineering Judgment	
Unit IV	**[6Hrs]**
Aptitude : Cubes and Dice Problems:- Number of cuts to be made, Number of colorful Faces of Cubes, Hidden Dice Number Imax: Disposition for Innovation, Disposition for Start up	
Unit V	**[6Hrs]**
Aptitude : Clocks :- Angle made by Hour hand, Minutes hand, Mirror and water Image of Clock, Behind and Ahead time concept Calendars :- Day on Specific date, Coded Calendars Problems, Calendars repetition Imax: Creating A Winning Resume, Patriotism Self - respect & Start - up	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Quantitative Aptitude By R. S. Aggarwal	R.S. Aggarwal		
2	Quantitative Aptitude	Shripad Deo		Allied Publication
3	A Modern Approach to Verbal & Non-Verbal Reasoning	R.S. Aggarwal		

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Quantitative Aptitude for CAT by Arun Sharma	Arun Sharma		

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Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
24AI407P	Micro Project - II *	-	-	2	1	--	50	--	50

Course Objectives	Course Outcomes
The Micro Project II course is designed to sensitize students to societal and community-oriented problems and enable them to apply data science concepts for social good. The course aims to provide hands-on experience in identifying real-world community issues, collecting and analyzing data, and proposing data-driven insights or solutions using basic data science tools and methodologies. This course emphasizes experiential learning, ethical data handling, teamwork, and reflective learning aligned with NEP 2.0.	1 Identify and clearly define a community or societal problem that can be addressed using data-driven approaches. 2 Apply fundamental data science techniques such as data preprocessing, basic statistical analysis, and simple visualization to extract meaningful insights. 3 Design and implement a basic data-driven model, dashboard, or analytical report that addresses the identified community problem. 4 Work effectively as an individual or in a team to plan, execute, document, and present the micro project outcomes. 5 Evaluate the impact, usefulness, and limitations of the proposed solution and reflect on learning gained through community engagement.

	[2Hrs]
Students shall undertake a Micro Project based on Community Engagement, preferably in collaboration with local communities, NGOs, schools, healthcare centers, municipal bodies, or campus-related stakeholders. The project should focus on applying data science concepts to solve or analyze a real-life problem of societal relevance.	

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Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
24AI431M	MDM – II Data Centric AI	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
This course is intended to 1. To Compare Model-Centric and Data-Centric AI, promote paradigm shift. 2. To use suitable Learning techniques in AI as per problem. 3. To use data acquisition, data pre-processing techniques. 4. To use data deployment and model deployment	**Students will be able to** 1. Analyze model-centric issues, justify shift to data- centric approach. 2. Discuss Learning techniques in AI 3. Explain data acquisition, data pre-processing, data augmentation techniques. 4. Discuss data deployment and model deployment method 5. Apply Data Versioning and Reproducibility, Data Security and Access Control.

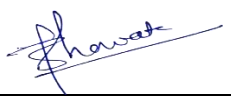
Unit I: Introduction to Data-centric A	**[8Hrs]**
Introduction to Model Centric AI: Model-centric trends in AI world, Types of Learning techniques in AI, Problems in Model Centric AI, Need for Paradigm Shift. Introduction to Data Centric AI: Phases of Data Centric AI, Data Acquisition, Data Labelling, Data Crowdsourcing, Data Pre-processing, Data Cleaning, Data annotation, Data Augmentation, Data Deployment.	
Unit II: Fundamentals of Data Acquisition, Data Pre-processing and Data Augmentation	**[9Hrs]**
Data Acquisition: Sources of Data, Processes to acquire data, Authenticity of Data acquired, Data Storage and Retrieval, Data Integration and Aggregation, Data Fusion and Multi-Modal Data Analysis ,Data Integration and Standardization in Multi-Source Data Acquisition Data Pre- processing: Need for Data Pre-processing, Data Cleaning, Data Labelling, Data annotation, Tools and Techniques for Data Labelling for Large Data Data Augmentation: Introduction to Data Augmentation, Need for Data Augmentation, Relationship between AI Model score and Data Augmentation, Trade-off for Data Augment.	
Unit III: Machine Learning Fundamentals for Data-Centric AI	**[9Hrs]**
Supervised Learning: Regression and classification algorithms, Model evaluation and selection , Unsupervised Learning: Clustering algorithms, Dimensionality reduction techniques, Semi- supervised and Self-supervised Learning: Strategies for utilizing unlabelled data ,Self-supervised learning frameworks, Reinforcement Learning: Basics of reinforcement learning, Application of reinforcement learning in data-centric AI, Model Performance Metrics, Confusion Metrics.	
Unit IV: Data Deployment	**[8Hrs]**
Data Deployment: Technical Debt in Software Development and AI, Data Accuracy, Statistical Significance of Data for Quality Training, Deplorable Data, Understanding the importance of deploying data, Overview of the data deployment process, Challenges and considerations in data deployment, Data Storage Solutions, Data Governance and Compliance, Data Versioning and Reproducibility, Data Security and Access Control.	
Unit V: Model Deployment:	**[11Hr]**
Overview of model deployment process, Challenges in model deployment, Introduction to Docker and containerization, Docker file and Docker image creation, Deployment Platforms and Services: Cloud deployment platforms, Serverless deployment options (e.g., AWS Lambda, Google Cloud Functions), Model deployment services (e.g., TensorFlow Serving, Sage Maker, Azure ML), Version control for machine learning models, Automated testing and validation Monitoring and Maintenance, Security and Scalability.	

Text Books

Sr. No.	Title	Authors	Edition	Publisher
1.	Introduction to Algorithms	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein	3rd	Prentice Hall of India
2.	The Design and Analysis of Computer Algorithms	Alfred V. Aho, John E. Hopcraft, Jeffrey D. Ullman	1st	Pearson education
3.	Fundamentals of Computer Algorithms	Horowitz, Sahani, Rajsekharam	2nd	University Press

Reference Books

Sr. No.	Title	Authors	Edition	Publisher
1.	Fundamentals of Algorithms	Brassard, Bratley	1st	Prentice Hall
2.	Design and Analysis of Algorithms	Parag Dave, Himanshu Dave	2nd	Pearson education

		**July 2025**	**NEP 2.1**	**Applicable for 2025-26**
Chairman - BoS	**Dean – Academics**	**Date of Release**	**Version**	