ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR

(An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech. Scheme of Examination & Syllabus 2025-26

ARTIFICIAL INTELLIGENCE

THIRD SEMESTER

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	No. of Hrs for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1	PCC	**25AI301T**	Discrete Mathematics	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**45**	3
2	PCC	**25AI302T**	Data Structures	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**45**	3
3	PCC	**25AI302P**	Data Structures Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	-
4	PCC	**25AI303T**	Database Management Systems	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**45**	3
5	PCC	**25AI303P**	Database Management Systems Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	-
6	PCC	**25AI304P**	Data Preprocessing and EDA Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	-
7	PCC	**25AI305P**	Object Oriented Programming Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	-
8	HS	**25AI306T**	Constitution of India	**2**	**-**	**-**	**2**	**10**	**10**	**30**	**50**	**23**	1.5
9	HS	**25AI307T**	Fundamentals of Entrepreneurship	**2**	**-**	**-**	**2**	**10**	**10**	**30**	**50**	**23**	1.5
10	SEC	**25AI341P**	Career Development – I	**-**	**-**	**2**	**1**	**-**	**50**	**-**	**50**	**25**	-
11	MDM	**25AI331M**	MDM - I (Refer MDM basket)	**2**	**-**	**-**	**2**	**10**	**10**	**30**	**50**	**23**	1.5
			Total	**15**	**0**	**10**	**20**	**90**	**240**	**370**	**700**		

Multidisciplinary Minor – I	
25AI331M	Responsible and Safe AI Systems

		July 2026	**NEP 3.0**	**Applicable for 2026-27**
Chairman - BoS	**Dean – Academics**	**Date of Release**	**Version**	

ARISE & SHINE

ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY,NAGPUR

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B. Tech. Scheme of Examination & Proposed Syllabus 2025-26

ARTIFICIAL INTELLIGENCE

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25AI301T	Discrete Mathematics	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
The aim of this course is 1. To understand the concepts of graph theory and related algorithm concepts. 2. To understand the concepts of algebraic structures, logic, set theory.	**On completion of the course, students will be able to** 1. Form truth tables, proving results by truth tables. 2. Observe the various types of sets, functions and relations. 3. Recognize definition and properties of algebraic structures. 4. Apply concepts of graph theory, shortest path algorithms, concepts of trees and minimum spanning tree to solve engineering problems. 5. Apply counting techniques to solve combinatorial problems.

Unit I : Mathematical logic & Set theory:	**[9Hrs]**
Introduction - Statements and notations, Connectives, Conditional statements and tautologies, Principle of Mathematical Induction, Validity of the argument, Basic concepts of set theory, Operations on sets, Power set.	
Unit II : Relation & Function:	**[11Hrs]**
Relation, types of relation, Matrix & Graphical representation of relation, Composition of relation, Partial ordering, Partial ordered set, Hasse diagram. Definition and types of function, Composition of function, Characteristic function.	
Unit III : Algebraic Structure & Lattices:	**[7Hrs]**
Binary operations, Group, Problems on groups, subgroup, Lagrange's theorem. Ring, Commutative ring, Ring with unity, Ring with zero divisor, Integral domain, and field. Lattice.	
Unit IV : Graph theory & Trees:	**[10Hrs]**
Types of graphs, Isomorphic digraph, Paths and circuits, Reachability and connectedness, Matrix representation of graphs, Euler path and Euler circuit. **Tree:** Trees, Binary tree, spanning tree, Weighted graphs, Prim's algorithm, Kruskal's algorithm.	
Unit V : Combinatorics :	**[8Hrs]**
Generating Functions, Recurrence Relations, Counting: Permutations & Combinations, Pigeonhole Principle with Simple Applications.	

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Discrete Mathematical Structures	Kolman, Busby & Ross	3rd	PHI
2.	Discrete Mathematical Structures with Applications to Computer Science	Tremblay & Manohar		Tata McGraw- Hill.
3.	Discrete mathematics	Swapan kumar Sarkar		S. Chand publications

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Discrete Maths for Computer Scientists & Mathematicians	Mott, Kandel, Baker		Pearson
2.	Discrete Mathematics	Lipschutz		McGraw Hill Professional,
3.	Elements of Discrete Mathematics	C. L. Liu		McGraw Hill Education India.

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Chairman - BoS	Dean – Academics	Date of Release	Version	

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ARTIFICIAL INTELLIGENCE

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25AI302T	Data Structures	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
This course is intended to 1. Provide a strong foundation in the principles and implementation of fundamental data structures and algorithms for efficient problem-solving. 2. Develop the ability to analyze algorithm complexity and apply appropriate data structures to design optimized solutions in real-world applications.	**Students will be able to** 1. Analyze the fundamental concepts of algorithms, asymptotic notations, and basic data structures like arrays. 2. Apply stacks and queues to solve problems related to expression conversion and evaluation. 3. Identify various types of linked lists and apply searching and sorting algorithms efficiently. 4. Demonstrate understanding of tree and graph data structures and implement traversal and pathfinding algorithms. 5. Apply hashing techniques to manage data efficiently using different collision resolution strategies and implement dictionary operations.

Unit I: Introduction to Data Structures and Arrays **[9Hrs]**

Algorithms, Asymptotic Notation, Introduction to Data Structures, Types of Data Structures, Data Structure Operations, Time and Space Complexity, Introduction to Arrays, Types of Arrays, Representation of One-Dimensional Array in Memory, Array Traversal, Insertion and Deletion, Sorting and Searching.

Unit II: Stacks and Queues **[9Hrs]**

Stacks-Definition, Operations, Applications of stacks – Representation and evaluation of expressions using Infix, Prefix and Postfix, Algorithms for conversions and evaluations of expressions from infix to prefix and postfix using stack. Queues — Basic Concept, Queue Operations, Queue Implementation, Circular Queues, Priority Queues, Double-Ended Queues.

Unit III: Linked List, Searching, and Sorting **[9Hrs]**

Linked Lists – Basic Concept, Linked List Implementation, Types of Linked Lists, Circular Linked List, Doubly Linked List Selection Sort, Insertion Sort, Bubble Sort, Quick Sort, Merge Sort. Linear Search Binary Search, Efficiency of Binary Search.

Unit IV: Trees and Graphs **[9Hrs]**

Basic Concept, Binary Tree, Binary Tree Representation, Binary Tree Traversal, Binary Search Tree, Tree Variants. Graph Basic Concept, Graph Terminology, Graph Implementation, Shortest Path Algorithm, Traversals-Breadth First Search, Depth First Search with algorithms. Definition and Minimum Spanning Tree Algorithms, Dijkstra Algorithms.

Unit V: Hashing **[9Hrs]**

General Idea, Hash Functions, Collision Resolution Techniques- Chaining, Open Addressing, Chaining without replacement, Chaining with Replacement, Quadratic Probing, Double Hashing.

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Data Structures using C	E Bala Guruswamy	2nd	McGraw Hill Education
2.	Data Structures	Anuradha A. Puntambekar	1st	Technical

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Data Structures- A Pseudo code Approach with C	Richard F Gillberg & Behrouz A. Forouzan	2nd	Cengage Learning,
2.	Data Structures Using C and C++,	Aaron M. Tanenbaum, Yedidyah Langsam and Moshe J. Augenstein,	2nd	PHI Learning Private Limited, Delhi India.

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THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
25AI302P	Data Structures Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
This course is intended to 1. Develop the ability to design, implement, and analyze basic and advanced data structures (arrays, linked lists, stacks, queues, trees, graphs, and hash tables) for solving computational problems. 2. Enable students to apply appropriate searching, sorting, and hashing techniques.	**Students will be able to** 1. Build arrays and apply basic algorithmic techniques, including time and space complexity analysis. 2. Develop programs to implement stacks and queues. 3. Construct and manipulate different types of linked lists (singly, doubly, circular), and implement efficient searching and sorting algorithms. 4. Design binary trees, binary search trees, and graph data structures. Apply tree traversal algorithms and graph traversal algorithms. 5. Apply hashing techniques to efficiently store and retrieve data.

Sr. No.	Title of Experiment
1	Insertion, deletion, and traversal operations on a one-dimensional array.
2.	Stack using arrays or linked lists. Perform push, pop, peek operations and check for underflow/overflow.
3.	Queue, Circular Queue, and Deque using arrays or linked lists. Perform enqueue, dequeue, display operations.
4.	Singly Linked List, Doubly Linked List, and Circular Linked List with insertion, deletion, and display operations.
5.	Bubble Sort, Selection Sort, and Insertion Sort algorithms on an array of integers. Display the sorted array.
6.	Binary Search Tree (BST) with operations: insertion, deletion, and searching. Perform Inorder, Preorder, and Postorder traversals.
7.	Breadth-First Search (BFS) and Depth-First Search (DFS) for a graph represented using adjacency matrix or list.
8.	Hash Table with collision handling using Separate Chaining and Open Addressing
	Open ended experiments
9.	Mini Library Management System using Data Structures
10.	Student Record System with Advanced Searching and Sorting

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Data Structures, A Pseudo code Approach with C,	Richard F Gillberg & Behrouz A. Forouzan	2nd	Cengage Learning,
2.	Data Structures Using C and C++,	Aaron M. Tanenbaum, Yedidyah Langsam and Moshe J. Augenstein,	2nd	PHI

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Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25AI303T	Database Management Systems	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
This course is intended 1. To train the fundamental concepts of database management system, database modeling and design, SQL system implementation techniques. 2. To enable students to model ER diagram for any customized applications. 3. To provide knowledge on distributed databases, concurrency techniques, federated systems and active databases.	**Students will be able to** 1. Explain the evolution, architecture, and key functionalities of DBMS, differentiating it from traditional file systems. 2. Apply SQL commands (DDL, DML, DCL, TCL) to define, manipulate, and control data in relational databases. 3. Construct ER diagrams to represent real-world scenarios and normalization techniques to optimize relational database schemas. 4. Analyze transaction management mechanisms including ACID properties, concurrency control, failure recovery, and query optimization techniques to improve database performance. 5. Develop advanced SQL queries using embedded SQL, procedures, and triggers for real-time applications.

Unit I: Introduction	**[9Hrs]**
History and motivation for database systems; Introduction to database systems :overview, File systems Vs DBMS, various data models, levels of abstraction, structures of DBMS, relational model, components of database systems; DBMS functions; Database Architecture, Data Independence.	
Unit II:SQL Data Handling	**[9Hrs]**
Data definition language (DDL) - Create , Alter , Drop, Rename, Comment , Data Manipulation Language (DML) - Insert , Update, Delete , Transaction control Language – Commit, Save-point, Rollback , Data Control Language - GRANT, REVOKE, DENY , Constraints – Not null , Unique , Primary Key, Foreign Key, Check , Default, Set Operations, Null values, Aggregate functions, Joints – Inner join, Left join, Outer Join, Right Join.	
Unit III: Data Models & Normalization	**[9Hrs]**
Entity Relationship Model, Development of ER Diagrams, Extended Entity Relationship Model ,Relational database design:Database design; multi-valued dependency ,Basic Concept of Normalization, need of Normalization, Codd's Relational Database Rules, functional dependency; normal forms; Types of Normalization – 1 NF , 2Nf,3NF, BCNF,4NF, 5NF.	
Unit IV: Transactions	**[9Hrs]**
ACID Properties , TCL, DCL, Failure and recovery; concurrency control in SQL, Overview of Query Processing, Measures of Query cost, Evaluation of relational algebra expressions, Query equivalence, Query optimization.	
Unit V: Advanced SQL	**[9Hrs]**
Dynamic SQL and Embedded SQL, Functions and Procedures, Triggers. Overview of OODBMS & Distributed DBMS, Introduction to NoSQL MongoDB, CRUD Operation in NoSQL MongoDB. – General Constraints, Create operation (insertone(), insertmany()), Read operation (find operation()), Update operation (UpdateOne(), updateMany(), replaceone()) , Delete operations (deleteone(), deletemany()).	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Database System Concepts	Abraham Silberschatz, Henry F. Korth and S. Sudarshan,	6th	McGraw Hill (SIE)
2	Database Systems - Models, Languages, Design and Application Programming	Ramez Elmasri and Shamkant Navathe	6th	Pearson Education

Reference Books

S.N	Title	Authors	Edition	Publisher
1	An introduction to database systems	C. J. Date	8th	Addison Wesley
2	Database system implementation	H. Garcia et al.,	2nd	Prentice Hall

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Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
25AI303P	Database Management Systems Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
This course is intended to 1. Ttrain the fundamental concepts of database management system, database modeling and design, SQL system implementation techniques. 2. Enable students to model ER diagram for any customized applications. 3. Provide knowledge on distributed databases, concurrency techniques, federated systems and active databases	**Students will be able to**· 1. Apply the knowledge of mathematics, science and computing appropriate to the discipline. 2. Solve issues of information systems using the learned database principles. 3. Construct a database application using current tools and techniques. 4. Analyze an overview of advance SQL for database application. 5. Develop SQL based application.

Expt. No.	List of Experiments
1	Database Creation & Deletion, Relation Creation & Deletion
2	DDL, DML, DCL & TCL commands
3	Constraints
4	Join & Set Operations
5	Functions and Trigger in SQL
6	ER diagram, Class diagram, UML diagram on a Tool.
7	NoSQL MongoDB on a CRUD operations.
8	Micro project based on the syllabus.

Reference Books

S.N	Title	Authors	Edition	Publisher
1	An introduction to database systems	C. J. Date	8th	Addison Wesley

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
25AI304P	Data Preprocessing and EDA Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
This course is intended to 1. Introduce Python programming environment for data processing tasks 2. Provide hands-on experience with data handling using NumPy and Pandas 3. Enable students to perform data preprocessing and transformation techniques 4. Develop skills in exploratory data analysis using statistical and visual methods 5. Help students to extract insights and patterns from real-world datasets	**Students will be able to** 1. Apply Python libraries such as NumPy, Pandas, Matplotlib, and Seaborn for data analysis 2. Analyze data inspection, cleaning, and preprocessing Effectively 3. Build feature scaling, encoding, and transformation techniques 4. Conclude exploratory data analysis using statistical Measures 5. Adapt Visualize datasets and interpret trends, correlations, and patterns

Expt. No.	Title of Experiments
1	Introduction to Python Environment, Jupyter Notebook, and Basic Data Handling using NumPy (Array Operations and Indexing)
2	Data Handling using Pandas: Series, Data Frames, Data Import (CSV, Excel, JSON) and Basic Data Export
3	Data Inspection and Profiling: Shape, Data Types, Descriptive Statistics, Value Counts, and Data Visualization Overview
4	Handling Missing Data, Duplicate Records, and Inconsistent Data (Imputation Techniques and Data Cleaning Methods)
5	Data Transformation Techniques: Encoding Categorical Variables, Normalization, Standardization, and Data Type Conversion
6	Micro Project – I: Data Cleaning and Transformation Project (Real-world dataset involving data import, inspection, cleaning, transformation, and basic visualization report)
7	Feature Scaling, Outlier Detection (IQR, Z-Score), and Data Distribution Analysis
8	Feature Engineering Techniques: Creating New Features, Binning, Aggregation, Grouping, and Pivot Tables using Pandas
9	Statistical Exploratory Data Analysis: Univariate, Bivariate, and Multivariate Analysis with Correlation and Covariance
10	Advanced Data Visualization using Matplotlib and Seaborn: Trends, Distributions, Heatmaps, Pairplots, and Comparative Analysis
11	Micro Project – II: Comprehensive Exploratory Data Analysis Project (End-to-end EDA including cleaning, feature engineering, statistical analysis, advanced visualization, and insight reporting)

Reference Books

S.N.	Title	Authors	Edition	Publisher
1	Python for Data Analysis	Wes McKinney	3rd	O'Reilly Media
2	Python Data Science Handbook	Jake VanderPlas	2nd	O'Reilly Media
3	Exploratory Data Analysis	John W. Tukey	1st	Addison-Wesley

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Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
25AI305P	Object Oriented Programming Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
This course is intended to 1. Provide hands-on experience with object-oriented programming concepts 2. Develop problem-solving skills using OOP principles 3. Enable students to design and implement real-world applications	**Students will be able to** 1. Apply object-oriented concepts such as classes, objects, inheritance, polymorphism, and abstraction. 2. Design modular and reusable code using OOP principles. 3. Implement exception handling and file handling mechanisms. 4. Identify object-oriented features to solve real-world Computational problems. 5. Develop structured and well-documented programs.

Expt.No.	Title of the Experiment
1	Study of Object-Oriented Programming Concepts and Programming Environment
2	Programs using Classes and Objects.
3	static functions.
4	Constructors and Destructors.
5	Friend function.
6	Inheritance (Single, Multilevel, Multiple)
7	Polymorphism (Function Overloading and Operator Overloading)
8	Programs using Virtual Functions and Runtime Polymorphism
9	Exception Handling Mechanisms
10	Mini Project based on Object Oriented Programming

Reference Books

S.N.	Title	Authors	Edition	Publisher
1	Object Oriented Programming with C++	E. Balagurusamy	8th	McGraw Hill
2	The Complete Reference – C++	Herbert Schildt	4th	McGraw Hill

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THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25AI306T	Constitution of India	2	-	-	2	10	10	30	50

Course Objectives	Course Outcomes
To enable students to interpret, apply, and analyze the principles of the Constitution of India in civic and social contexts, and develop responsible citizenship with ethical, democratic, and value-based decision-making skills.	**At the end of the course, students will be able to:** 1.Examine the concepts of the Constitution, including Preamble, Fundamental Rights, constitutional vision, and governance mechanisms. 2.Apply Fundamental Duties, Directive Principles of State Policy, Constitutional Remedies, and citizen responsibilities in real-life civic and social situations. 3.Apply constitutional values of equality, justice, dignity, environmental responsibility, and social responsibility to address social and ethical issues. 4.Analyze contemporary civic issues using Six Thinking Hats technique, group discussions, speeches, and mock parliamentary role play.

Unit I : Introduction to the Constitution	**[10 Hrs]**
Preamble and Salient Features of the Constitution Fundamental Rights Constitutional Vision Right to Information (RTI) and transparency in governance Mock Parliament / Parliamentary Role Play	
Unit II : Duties and Citizenship	**[10 Hrs]**
Fundamental Duties and Directive Principles of State Policy Gender equality, social justice, human dignity and relationships Environmental awareness Constitutional Remedies Speeches on democracy and equality and civic awareness	
Unit III : Constitution and Society	**[10 Hrs]**
Basic values in everyday life Democracy, Corruption and ethical citizenship Role of education and youth in nation-building Civic decision making using Six Thinking Hats Technique Group discussions on contemporary civic issues	

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Introduction to Constitution of India	Durga Das Basu	21st edition	LexisNexis
2.	Working in a Democratic Constitution: A History of the Indian Experience	Austin Granville	7th edition	Oxford University Press
3.	The Indian Political System	Mahendra Pratap Singh	3rd revised edition	Pearson Education India
4.	A New Look into Social Sciences	Shabbir, Sheikh and Dwadashiwar	3rd edition	S.Chand

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25AI307T	Fundamentals of Entrepreneurship	2	-	-	2	10	10	30	50

Course Objectives	Course Outcomes
1. To strengthen business acumen and an entrepreneurial attitude in order to improve employment opportunities and cultivate entrepreneurial abilities. 2. To introduce the necessary skills to develop ventures beyond the idea/prototype stage.	1. Develop an entrepreneurial mindset by applying the five effectuation principles [Bird in hand Affordable Loss, Lemonade, Patchwork Quilt or Crazy Quilt, and Pilot-in-the-Plane]. 2. Apply Design Thinking to identify user needs and define real-world problems from a human-centered perspective. 3. Create your own business model using the Lean Canvas template.

Unit I **[10 Hrs]**

Self-Discovery: Find your flow (passion), Principles of Effectuation, Selecting Venture Team. Opportunity Discovery: Identifying problem worth solving, Problem clarification - Understanding of the problem – Problem analysis - Reformulation of the problem - Observation Phase - Empathetic design - Tips for observing - Methods for Empathetic Design

Unit II **[10 Hrs]**

Design Thinking, Look for Solutions. Customer & Solution: Customers & Markets, Identify Market Segment and Niche Market, Identify Jobs, Pains & Gains and Early Adopters, Craft your Value Proposition Canvas, Problem Solution fit.

Unit III **[10 Hrs]**

Basics of Business Model and Lean Approach, Craft your Business Model (Lean Canvas), Risks & Assumptions, Pitching your Business Model. Validation: Blue Ocean Strategy, Building Solution Demo & Conducting Solution interviews, Building an MVP(Minimum Viable Product).

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Innovation and entrepreneurship : practice and principles	Peter Drucker	1986	Allied Publishers
2.	Knowledge-Driven Entrepreneurship,The Key to Social and Economic Transformation	Andersson, Thomas, Formica, Piero, Curley, Martin G	2009	Springer book series

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Entrepreneurial Development	Khanka S.S.	2020	S. Chand Publications
2.	Effectual Entrepreneurship	Stuart Read, Saras Sarasvathy, Nick Dew, Robert Wiltbank, and Anne-Valérie Ohlsson	2016	Routledge

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Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
25AI341P	Career Development – I	-	-	2	1	50	-	50

Course Objectives	Course Outcomes
To develop students' quantitative aptitude, logical reasoning, verbal communication, critical thinking, self-management, and professional employability skills required for academic success, competitive examinations, and workplace readiness.	**CO1.** Students will be able to solve problems related to number systems, logical series, equations, ratios, proportions, and arrangement-based reasoning with accuracy and logical understanding. **CO2.** Students will be able to apply concepts of percentage, partnership, profit and loss, discount, simple interest, and compound interest to solve practical and business-oriented numerical problems. **CO3.** Students will be able to perform SWOC analysis, formulate SMART goals, and demonstrate professional verbal communication skills in workplace environments. **CO4.** Students will be able to construct logical arguments, participate effectively in debates, and deliver coordinated group presentations with confidence and clarity. **CO5.** Students will be able to demonstrate proficiency in grammar, vocabulary, reading comprehension, and professional communication while exhibiting consistent participation, individual responsibility, collaborative teamwork, and professional classroom conduct.

Unit I (10 marks)	**[7Hrs]**
Number System: - Divisibility Test, LCM/HCF Problems, Factorization, Successive Division, **Number Series:-** Missing Number Series, Wrong Number series, Letter Series, Analogy (Number, Letter, Word, Non Verbal analogy), **Simple Equations :-** Two digit, 3 digit, ages and puzzles questions**, Ratio & Proportion:-** Joining of two ratios, Proportion, Mean Proportions, Problems on ages Linear, circular Arrangement	
Unit II (15 marks)	**[7Hrs]**
Percentage: - Percentage to ratio conversion, Successive Percentage, Increase Decrease of Percentage, etc. Partnership Problems, **Profit Loss:-** Concept of Profit loss, Relation between CP ,SP Profit and Loss, Problems on Profit Loss. **Discount:-** Successive Discount, Relation between MP Discount and Selling Price, Problems based on Discount, Simple Interest, Compound Interest	
Unit III (5 marks)	**[5Hrs]**
SWOC Analysis and SMART Goal Setting for Personal and Professional Development **Corporate Communication I –** Professional Verbal Communication in Workplace Environments-	
Unit IV (10 marks)	**[6Hrs]**
Debating Skills – Logical Thinking, Argument Building, and Public Speaking **Group Presentation Skills** – Team Coordination, Public Speaking, and Presentation Techniques	
Unit V (10 marks)	**[3Hrs]**
Verbal Ability Quiz – Grammar, Vocabulary Building, and Reading Comprehension for Professional Communication **Continuous Assessment** - Attendance, Individual Engagement & Team Dynamics	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Quantitative Aptitude By R. S. Aggarwal	R.S. Aggarwal		
2	Quantitative Aptitude	Shripad Deo		Allied Publishers Pvt Ltd
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		
2	How to Develop Self-Confidence & Influence People by Public Speaking	Dale Carneige	2004	Sulabh Publications
3	Professional Communication Skills	Alok Jain	2006	S Chand & Company Ltd
4	Soft Skills & Employability Skills	Sabina Pillai	2008	Cambridge

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THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25AI331M	MDM – I Fundamentals of Artificial Intelligence	2	-	-	2	10	10	30	50

Course Objectives	Course Outcomes
This course is intended to provide 1. Explain fundamental concepts of Artificial Intelligence including problem solving and reasoning 2. Apply basic machine learning techniques to real-world problems	**Students will be able to** 1. Describe AI concepts, agents, and search techniques 2. Apply reasoning and basic machine learning methods 3. Identify applications of AI in different domains

Unit I: Introduction and Problem Solving	**[10Hrs]**
Introduction to AI, history and applications of AI, intelligent agents and environments, problem formulation, state space representation, search techniques: uninformed search (BFS, DFS), informed search (heuristics, A*), optimization basics	
Unit II: Knowledge Representation and Reasoning	**[10Hrs]**
Knowledge representation, propositional logic, first-order logic, inference mechanisms, reasoning under uncertainty, basics of probability in AI, Bayesian reasoning, introduction to machine learning concepts	
Unit III: Machine Learning and AI Applications	**[10Hrs]**
Overview of machine learning (supervised and unsupervised learning), basic algorithms (linear regression, classification, clustering), introduction to neural networks and deep learning, natural language processing basics, computer vision basics, AI applications in real-world domains	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Artificial Intelligence: A Modern Approach	Stuart Russell Peter Norvig	1st	Prentice Hall
2	Artificial Intelligence: The Basics	Kevin Warwick, Routledge	2nd	Routledge

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Fundamentals of artificial Intelligence	Prof. Shyamanta M. Hazarika	NPTEL	https://nptel.ac.in/courses/112103280