Madhav Institute of Technology & Science, Gwalior

Modes of Teaching

Subject: AI in Robotics (240603)

UNIT		CONTENT	MODE
Unit-1	[1]	Artificial Intelligence Brief History, Thinking and acting humanly	Offline / Black Board Teaching
	[2]	Categorization of Intelligent Systems	Online mode
	[3]	AI Program Components	Online mode
	[4]	AI Foundations	Offline / Black Board Teaching
	[5]	Sub-areas of AI, Applications	Activity based Learning
	[6]	Artificial Intelligence in Robotics	Activity based Learning
	[7]	AI-Language development	Offline / Black Board Teaching
Unit-2	[8]	Need for Image processing in AI	Learning through demonstration
	[9]	Image Sensing and Acquisition	Online mode
	[10]	Image Enhancement: Histogram processing	Offline / Black Board Teaching
	[11]	Smoothing and Sharpening Spatial Filtering	Offline / Black Board Teaching
	[12]	Noise removal	Offline / Black Board Teaching
	[13]	Image Restoration: Mean Filters	Offline / Black Board Teaching
	[14]	Wiener filtering	Group based Learning
	[15]	Image Segmentation: Edge detection	Offline / Black Board Teaching
	[16]	Thresholding	Offline / Black Board Teaching
	[17]	Region-based segmentation and Recognition: descriptor, classification	Offline / Black Board Teaching
Unit-3	[18]	Intelligent Robot Control	Learning through experimentation
	[19]	Vision	Online mode
	[20]	Planning Approach	Online mode
	[21]	Algorithm for Intelligent Robot System	Online mode
	[22]	Continuous Path Control	Online mode
	[23]	Control System for Robot Joint	Group based Learning
	[24]	Control Actions	Group based Learning
	[25]	Feedback Device	Group based Learning
Unit-4	[26]	Planning with forward and backward state space search	Online mode
	[27]	Partial order planning	Online mode
	[28]	Planning graphs	Offline / Black Board Teaching
	[29]	Planning with propositional logic	Online mode
	[30]	Planning and acting in the real world	Learning through demonstration
Unit-5	[31]	Uninformed Search Strategies: Breadth-First Search	Offline / Black Board Teaching
	[32]	Uniform Cost Search	Offline / Black Board Teaching
	[33]	Depth-First Search	Offline / Black Board Teaching

[34]	Analysis of Search Methods	Learning through experimentation
[35]	Informed Search Strategies: Heuristic Functions	Offline / Black Board Teaching
[36]	Best-First Search and Greedy Search	Offline / Black Board Teaching
[37]	A* Algorithm, Optimal Solution by AO* Algorithm	Learning through Project

Online	Offline						
	Black Board Teaching	Group based Learning	Learning through projects	Learning through demonstration	Learning through experimentation	Activity based Learning	Onsite/field based learning
27.02%	43.24%	10.81%	2.70%	5.40%	5.40%	5.40%	-

LECTURE PLAN

Name: Dr. Anshika Srivastava

Designation: Assistant Professor

Department: Information Technology (AI and DS)

Name of Course with Code: AI in Robotics (240603) **Class:** VI Semester **Session:** January-June, 2023				
Teaching Session	**Content to be covered**	**COs**	**Blooms Level**	**% Coverage (to be calculated based on the total syllabus)**
UNIT 1				
1.	Artificial Intelligence Brief History, Thinking and acting humanly	1	1	1.5
2.	Categorization of Intelligent Systems	1	1	2.5
3.	AI Program Components	1	1	3
4.	AI Foundations	1	1	3
5.	Sub-areas of AI, Applications	1	1	1.5
6.	Artificial Intelligence in Robotics	1	1	3.5
7.	AI-Language development	1	1	2.5
8.	Current AI Trends, Future potential of AI	1	1	2.5
UNIT 2				
9.	Need for Image processing in AI	3	2	3.5
10.	Image Sensing and Acquisition	3	2	2
11.	Image Enhancement: Histogram processing	3	2	2

12.	Smoothing and Sharpening Spatial Filtering	3	2	1
13.	Noise removal	3	2	1
14.	Image Restoration: Mean Filters	3	2	2
15.	Wiener filtering	3	2	1
16.	Image Segmentation: Edge detection	3	2	2
17.	Thresholding	3	2	2.5
18.	Region-based segmentation and Recognition: descriptor, classification	3	2	1.5
19.	Region-based segmentation and Recognition: descriptor, classification	3	2	1.5
UNIT 3				
20.	Intelligent Robot Control	2	2	2.5
21.	Vision	2	2	2
22.	Planning Approach	2	2	3.5
23.	Algorithm for Intelligent Robot System	2	2	4
24.	Continuous Path Control	2	2	3.5
25.	Control System for Robot Joint	2	2	1.5
26.	Control Actions	2	2	1.5
27.	Feedback Device	2	2	1.5
UNIT 4				
28.	Planning with forward and backward state space search	4	2	3.5
29.	Partial order planning	4	2	3
30.	Planning graphs	4	2	2
31.	Planning with propositional logic	4	2	2
32.	Planning and acting in the real world	4	2	3

	UNIT 5				
33.	Uninformed Search Strategies: Breadth-First Search	5	3, 4	3	
34.	Uniform Cost Search	5	3, 4	3	
35.	Depth-First Search	5	3, 4	3	
36.	Analysis of Search Methods	5	4	3.5	
37.	Informed Search Strategies: Heuristic Functions	5	3,4	3	
38.	Best-First Search and Greedy Search	5	3,4	3	
39.	A* Algorithm, Optimal Solution by AO* Algorithm	5	5	4	
40.	Applications of AI-based Robotic system	6	6	4	

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Modes of Teaching

Subject: Compiler Design

UNIT	CONTENT	MODE
Unit-1	Overview of Translation Process: Introduction to Compiler, Translator, Interpreter and Assembler	Offline / Black Board Teaching
	Overview and use of Linker and Loader	Online mode
	Major Data Structures in Compiler , Other Issues in Compiler Structure, BOOT Strapping and Porting	Offline / Black Board Teaching
	Compiler Structure: Analysis-Synthesis Model of Compilation, Various Phases of a Compiler	Learning through experimentation
	Tool Based Approach to Compiler Construction	Online mode
Unit-2	Lexical Analysis: Input Buffering, Symbol Table, Token, Recognition of Tokens	Learning through mini projects
	Lexeme and Patterns, Difficulties in Lexical Analysis	Learning through experimentation
	Error Reporting and Implementation	Online mode
	Regular Grammar & Language Definition	Online mode
	Transition Diagrams	Online mode
	Design of a Typical Scanner using LEX	Learning through demonstration
Unit-3	Syntax Analysis: Context Free Grammars (CFGs), Ambiguity	Activity based Learning
	Basic Parsing Techniques: Top Down Parsing, Recursive Descent Parsing	Offline / Black Board Teaching
	Transformation on the Grammars, Predictive Parsing LL(1) Grammar	Online mode
	Bottom-UP Parsing	Group based Learning
	Operator Precedence Parsing	Learning through demonstration
	LR Parsers (SLR, CLR, LALR)	Activity based Learning
	Design of a Typical Parser Using YACC	Learning through projects
Unit-4	Semantic Analysis: Compilation of Expression, Control, Structures, Conditional Statements	Offline / Black Board Teaching
	Various Intermediate Code Forms, Syntax Directed Translation	Online mode
	Memory Allocation and Symbol Table Organizations	Online mode
	Static and Dynamic Array Allocation	Group based Learning
	String Allocation, Structure Allocation etc.	Online mode
	Error Detection Indication and Recovery	Online mode
	Routines or Printing Various Lexical, Syntax and Semantic Errors	Group based Learning
Unit-5	Code Generation and Code Optimization: Issues, Basic Blocks and Flow Graphs, Register Allocation, Code Generation, DAG	Offline / Black Board Teaching
	Code Generation from DAGS, Peep-hole Optimization, Code Generator Generators, Specification of Machine	Online mode
	Code Optimization: Source of Optimizations, Optimization of Basic Blocks, Loops, Global Data Flow Analysis, Solution to Iterative Data Flow Equations	Offline / Black Board Teaching
	Code Improving Transformations, Dealing with Aliases, Data Flow Analysis of Structured Flow Graphs.	Online mode

Online	Offline						
	Black Board Teaching	Group based Learning	Learning through projects	Learning through demonstration	Learning through experimentation	Activity based Learning	Onsite/field based learning
40%	20%	10%	6.66%	10%	6.66%	6.66%	-

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Modes of Teaching

Subject: Compiler Design

Teaching session	Content to be covered	COs	Blooms Level (BL)	% Coverage(to be calculated based on the total syllabus)
1	Overview of Translation Process: Introduction to Compiler	CO1	Understanding	2
2	Translator, Interpreter and Assembler	CO2	Analyzing	2
3	Overview and use of Linker and Loader	CO3	Understanding	2
4	Major Data Structures in Compiler	CO2	Applying	3
5	Other Issues in Compiler Structure	CO1	Understanding	2
6	BOOT Strapping and Porting	CO4	Understanding	3
7	Compiler Structure: Analysis-Synthesis Model of Compilation	CO5	Analyzing	3
8	Various Phases of a Compiler	CO4	Understanding	2
9	Tool Based Approach to Compiler Construction	CO5	Analyzing	2
10	Lexical Analysis: Input Buffering, Symbol Table	CO4	Understanding	3
11	Token, Recognition of Tokens, Lexeme and Patterns	CO6	Applying	3
12	Difficulties in Lexical Analysis	CO4	Understanding	2
13	Error Reporting and Implementation	CO4	Analyzing	3
14	Regular Grammar & Language Definition	CO5	Applying	2
15	Transition Diagrams	CO5	Analyzing	3
16	Design of a Typical Scanner using LEX.	CO5	Applying	3
17	Syntax Analysis: Context Free Grammars (CFGs), Ambiguity	CO5	Understanding	2
18	Basic Parsing Techniques: Top Down Parsing	CO5	Applying	2
19	Recursive Descent Parsing	CO3	Analyzing	3
20	Transformation on the Grammars, Predictive Parsing LL(1) Grammar	CO3	Analyzing	3
21	Bottom-UP Parsing	CO3	Applying	3
22	Operator Precedence Parsing	CO5	Analyzing	2
23	LR Parsers (SLR, CLR, LALR)	CO5	Analyzing	3
24	Design of a Typical Parser Using YACC	CO6	Analyzing	2
25	Semantic Analysis: Compilation of Expression	CO6	Analyzing	3
26	Control, Structures, Conditional Statements	CO5	Applying	3
27	Various Intermediate Code Forms, Syntax Directed Translation	CO4	Applying	3
28	Memory Allocation and Symbol Table Organizations	CO5	Understanding	3
29	Static and Dynamic Array Allocation	CO6	Applying	3

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Modes of Teaching

Subject: Compiler Design

32	Routines or Printing Various Lexical, Syntax and Semantic Errors.	CO4	Understanding	2
33	Code Generation and Code Optimization: Issues, Basic Blocks and Flow Graphs	CO5	Analyzing	2
34	Register Allocation, Code Generation, DAG Representation of Programs	CO6	Analyzing	2
35	Code Generation from DAGS, Peep-hole Optimization	CO5	Understanding	2
36	Code Generator Generators, Specification of Machine. Code Optimization:	CO4	Applying	3
37	Source of Optimizations, Optimization of Basic Blocks, Loops, Global Data Flow Analysis	CO5	Applying	2
38	Solution to Iterative Data Flow Equations	CO6	Analyzing	3
39	Code Improving Transformations, Dealing with Aliases	CO6	Applying	2
40	Data Flow Analysis of Structured Flow Graphs	CO6	Analyzing	2

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Modes of Teaching
Subject: DATA MINING & PATTERN WAREHOUSING

UNIT	CONTENT	MODE
Unit-1	Motivation, importance, Data type for Data Mining	Offline / Black Board Teaching
	Relational Databases, Data Ware-Houses. Transactional Databases, Advanced Database System	Online mode
	Data Mining Functionalities, Concept/Class Description, Association Analysis Classification & Prediction	Offline / Black Board Teaching
	Cluster Analysis, Outliner Analysis	Learning through experimentation
	Classification of Data Mining Systems	Online mode
	Major Issues in Data Mining	Learning through demonstration
Unit-2	Data Pre-processing: Data Cleaning, Data Integration and Transformation	Online mode
	Discretization and Concept Hierarchy Generation and Data Reduction	Learning through experimentation
	Data Mining Primitives Languages and System Architectures	Online mode
	Concept Description, Characterization & Comparison Analytical	Online mode
	Data Warehouse and OLTP Technology for Data Mining: Differences between Operational Database Systems & Data Warehouse	Offline / Black Board Teaching
	Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation,	Online mode
Unit-3	Mining Association Rules in Large Databases	Activity based Learning
	Association Rule Mining: Market Basket Analysis, Concepts	Learning through demonstration
	Mining Single Dimensional Boolean Association Rules from Transactional Databases	Online mode
	Apriori Algorithm, Generating Association Rules from Frequent Items, Improving the Efficiency of Apriori	Group based Learning
	Algorithms & their Comparison	Group based Learning
	Mining Multilevel Association Rules	Activity based Learning
	Multidimensional Association Rules, Constraint Based Association Rule Mining	Online mode
Unit-4	Classification & Prediction and Cluster Analysis	Offline / Black Board Teaching
	Issues Regarding Classification & Prediction	Online mode
	Different Classification Methods	Online mode
	Prediction, Cluster Analysis	Learning through demonstration
	Major Clustering Methods	Online mode
	Currently Available Tools	Learning through projects
	Advantages and Application of Clustering	Group based Learning
Unit-5	Pattern Warehousing System	Offline / Black Board Teaching
	Pattern Warehouse, Process flow for Pattern Warehouse, Benefits of Pattern Warehousing	Learning through projects
	Difference between Pattern Warehousing and Data Warehousing Architecture of Pattern Warehousing	Offline / Black Board Teaching
	Challenging Issues in Pattern Warehouse, Profitable Pattern Mining, Hesitation Mining, Case Study in Stock Market, Super Market	Online mode

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Online	Offline						
	Black Board Teaching	Group based Learning	Learning through projects	Learning through demonstration	Learning through experimentation	Activity based Learning	Onsite/field based learning
40%	20%	10%	6.66%	10%	6.66%	6.66%	-

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Lecture Plan
Subject: DATA MINING & PATTERN WAREHOUSING

Teaching session	Content to be covered	COs	Blooms Level (BL)	% Coverage (to be calculated based on the total syllabus)
1	Data Mining Introduction and Motivation	CO1	Understanding	2
2	Data Mining importance	CO2	Analyzing	2
3	Data type for Data Mining	CO3	Understanding	2
4	Relational Databases, Data WareHouses	CO2	Applying	3
5	Transactional Databases, Advanced Database System	CO1	Understanding	2
6	Data Mining Functionalities	CO4	Applying	3
7	Concept/Class Description	CO5	Analyzing	3
8	Association Analysis	CO5	Applying	2
9	Classification & Prediction	CO2	Applying	2
10	Cluster Analysis, Outliner Analysis	CO5	Applying	3
11	Classification of Data Mining Systems , Major Issues in Data Mining	CO6	Applying	3
12	Data Pre-processing: Data Cleaning	CO5	Applying	2
13	Data Integration and Transformation	CO4	Analyzing	3
14	Discretization and Concept Hierarchy Generation	CO2	Understanding	2
15	Data Mining Primitives Languages	CO4	Analyzing	3
16	System Architectures	CO3	Applying	3
17	Concept Description, characterization and Comparison Analytical	CO4	Applying	2
18	Multidimensional Data Model, Data Warehouse Architecture	CO5	Analyzing	2
19	Data Warehouse Implementation, Data Cube Technology	CO6	Analyzing	3
20	Mining Association Rules in Large Databases	CO2	Analyzing	3
21	Association Rule Mining: Market Basket Analysis, Basic Concepts	CO4	Applying	3
22	Mining Single Dimensional Boolean Association	CO4	Analyzing	2
23	Apriori Algorithm	CO5	Analyzing	3
24	Generating Association Rules from	CO6	Analyzing	2
25	FP Growth Algorithms & their Comparisons	CO1	Analyzing	3
26	Mining Multilevel Association Rules	CO2	Applying	3
27	Multidimensional Association Rules, Constraint Based Association Rule Mining	CO4	Applying	3

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28	Classification & Prediction and Cluster Analysis	CO5	Understanding	3
29	Issues Regarding Classification & Prediction	CO6	Applying	3
30	Different Classification Methods	CO4	Analyzing	2
31	Prediction, Cluster Analysis	CO3	Analyzing	3
32	Major Clustering Methods	CO4	Understanding	2
33	Currently Available Tools	CO5	Analyzing	3
34	Pattern Warehousing System	CO6	Analyzing	3
35	Pattern Warehouse, Process flow for Pattern Warehouse	CO5	Understanding	2
36	Benefits of Pattern Warehousing	CO4	Applying	3
37	Difference between Pattern Warehousing and Data Warehousing, Architectural aspects of Pattern Warehousing, Types of Pattern Warehouses	CO5	Applying	2
38	Challenging Issues in Pattern Warehouse, Profitable Pattern Mining	CO6	Analyzing	3
39	Hesitation Mining, Case Study in Stock Market, Super Market	CO2	Applying	2

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Modesof Teaching
Subject: Artificial Intelligence & Machine Learning
(160603)

UNIT	CONTENT	MODE
Unit-1	Definition, Goals of AI, Task of AI	Offline/BlackBoardTeaching
	Computation, Psychology and Cognitive Science	Onlinemode
	Perception, Understanding and Action	Offline/BlackBoardTeaching
	Artificial Intelligence vs Machine Learning vs Deep Learning	Learningthrough experimentation
	Applications of Artificial intelligence in real world	Onlinemode
Unit-2	Production System	Onlinemode
	Blind Search	Learningthrough experimentation
	BFS & DFS	Onlinemode
	Heuristic Search	Onlinemode
	Hill Climbing	Learningthrough demonstration
	Best First Search	Onlinemode
	Introduction to Neural Networks	Learningthrough demonstration
	History, Biological Neuron	Onlinemode
	Artificial Neural Network	Offline/BlackBoardTeaching
	Neural Network Architectures	Learningthrough experimentation
	Classification, & Clustering	Offline/BlackBoardTeaching
	Traditional Programming vs Machine Learning	Group based Learning
Unit-3	Key Elements of Machine Learning	Activity based Learning
	Representation, Process (Data Collection, Data Preparation, Model Selection)	Offline/BlackBoardTeaching
	Model Training, Model Evaluation and Prediction	Onlinemode
	Evaluation and Optimization	Learningthrough experimentation
	Types of Learning	Group based Learning
	Supervised, Unsupervised and Reinforcement Learning	Activity based Learning
	Regression vs Classification Problem	Onlinemode
Unit-4	Supervised Machine Learning	Offline/BlackBoardTeaching
	Linear Regression: Implementation	Learningthrough experimentation
	Applications & Performance Parameters	Onlinemode
	Decision Tree Classifier	Learningthrough demonstration
	Classification vs Regression Trees	Onlinemode
	Tree Creation with Gini Index and Information Gain	Learningthrough experimentation
	IDE Algorithms	Learningthrough demonstration
	Applications and Performance Parameters	Group based Learning
	Random Forest Classifier	Offline/BlackBoardTeaching
	Case Study on Regression and Classification for solving real world problems	Onlinemode

Unit-5	Introduction, Types: Partitioning, Density Based	Offline/BlackBoardTeaching
	DBSCAN	Learningthrough projects
	Distribution Model-Based, Hierarchical	Learningthrough demonstration
	Agglomerative and Divisive	Onlinemode
	Common Distance Measure	Offline/BlackBoardTeaching
	K-Means Clustering Algorithm	Offline/BlackBoardTeaching
	Case Study on Clustering for solving real world problems	Onlinemode

Online	Offline						
	Black Board Teaching	Group based Learning	Learning through projects	Learning through demonstration	Learning through experimentation	Activity based Learning	Onsite/field based learning
36.66%	16.66%	6.66%	3.33%	13.33%	16.66%	6.66%	-

Madhav Institute of Technology & Science, Gwalior

Department of Information Technology

Lecture Plan

Artificial Intelligence & Machine Learning (160613):   Class: IT   **Session: January-June 2023**

Teaching Session	Content to be covered	COs	Blooms Level (BL)	% Coverage (to be calculated based on the total syllabus)
1	Definition, Goals of AI, Task of AI	1,	BL 1	2%
2	Computation, Psychology and Cognitive Science	1	BL 1, 2	3%
3	Perception, Understanding and Action	1	BL 2	2%
4	Artificial Intelligence vs Machine Learning vs Deep Learning	1	BL 3	2%
5	Applications of Artificial intelligence in real world	5,6	BL 4	4%
6	Production System	2	BL 2	2%
7	Blind Search	2	BL 2	2%
8	BFS & DFS	2	BL 2	2%
9	Heuristic Search	2	BL 2	2%
10	Hill Climbing	2	BL 2	2%
11	Best First Search	2	BL 2	2%
12	Introduction to Neural Networks	1	BL 2	2%
13	History, Biological Neuron	1	BL 1,2	2%
14	Artificial Neural Network	1	BL 2,3	3%
15	Neural Network Architectures	1	BL2,3	2%
16	Classification, & Clustering	1,2	BL 2	4%
17	Traditional Programming vs Machine Learning	3,4	BL 2,3	2%

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Department of Information Technology

18	Key Elements of Machine Learning	3,4	BL1, 2	2%
19	Representation, Process (Data Collection, Data Preparation, Model Selection)	3,4	BL 3, 4	3%
20	Model Training, Model Evaluation and Prediction	3,4	BL 3, 4	3%
21	Evaluation and Optimization	3,4	BL 3	3%
22	Types of Learning	3,4	BL 2	2%
23	Supervised, Unsupervised and Reinforcement Learning	3,4	BL 2	3%
24	Regression vs Classification Problem	3,4	BL 1, 2	3%
25	Supervised Machine Learning	4	BL 2	2%
26	Linear Regression: Implementation	4	BL 3	2%
27	Applications & Performance Parameters	4	BL 3	4%
28	Decision Tree Classifier	4	BL 2, 3	2%
29	Classification vs Regression Trees	4	BL 1, 2	3%
30	Tree Creation with Gini Index and Information Gain	4	BL 3,4	2%
31	IDE Algorithms	4	BL 2	2%
32	Applications and Performance Parameters	4	BL 2,3	2%
33	Random Forest Classifier	4	BL 2	2%
34	Case Study on Regression and Classification for solving real world	5.6	BL 4	5%
35	Introduction, Types: Partitioning, Density Based	3,4	BL 2	2%
36	DBSCAN	3,4	BL 2	2%
37	Distribution Model-Based, Hierarchical	3,4	BL 2	3%
38	Agglomerative and Divisive	3,4	BL 2	2%
39	Common Distance Measure	3,4	BL 2	2%
40	K-Means Clustering Algorithm	3,4	BL 2,3	2%
41	Case Study on Clustering for solving real world problems	5,6	BL 4	4%