SILVER OAK UNIVERSITY

College of Technology

Bachelor of Technology
Information Technology
Course Name: Data Science
Course Code:1010043361
Semester:5th

Prerequisite:

Ability to learn new artificial intelligence, machine learning and deep learning algorithms, Good analytical skills, Good problem solving skills

Objective:

1. The course will introduce the students with concepts of artificial intelligence.
2. The course will introduce the students with concepts of machine learning.
3. The course will teach to build the applications using artificial intelligence and machine learning for various domains.

Teaching Scheme:

Teaching Scheme				
L	T	P	Contact Hours	Credit
3	0	2	5	4

Contents:

Unit	Topics	Teaching Hours	Weightage %
1	**Introduction to AI:** The AI Problems, The Underlying Assumption, AI techniques, The Level of The Model, Problems in AI, Criteria For Success.	5	10
2	**State Space Search & Heuristic Search Techniques:** Defining The Problems As A State Space Search, Production Systems, Production Characteristics, Production System Characteristics and Issues in the Design of Search Programs, Generate-And-Test, Hill Climbing, Best-First Search, Problem Reduction, Constraint Satisfaction, Means-Ends Analysis.	6	15
3	**Game Playing:** Overview, Minimax Search Procedure, Alpha-Beta Cut-offs, Refinements, Iterative deepening.	6	15
4	**Introduction to Machine Learning:** Overview of Human Learning and Machine Learning, Types of Machine Learning, Applications of Machine Learning , Tools and Technology for Machine Learning	5	10
5	**Preparing to Model:** Machine Learning activities, Types of data in Machine Learning, Structures of data, Data quality and remediation, Data Pre-Processing: Dimensionality reduction, Feature subset selection.	7	20
6	**Neural Network:** Introduction to neural network, Biological and Artificial Neurons, Types of Activation functions, Implementation of	7	20

	ANN, Architecture, Leaning process, Backpropagation, Deep Learning, GANs.		
7	**NLP(Natural Language Processing):** What is NLP? History of NLP, Advantages of NLP, Disadvantages of NLP, Components of NLP, Applications of NLP, How to build an NLP pipeline? Phases of NLP, NLP APIs, NLP Libraries	6	10

Course Outcomes:

Sr. No.	CO Statement	Unit
CO-1	Analyze the search technique procedures applied to real world problems.	1
CO-2	Simulate the mathematical relationships within and across Machine Learning algorithms.	2,3
CO-3	Evaluate the various Supervised and Unsupervised Learning algorithms using appropriate Dataset	4,5
CO-4	Evaluate the Deep learning Algorithms	6
CO-5	Design various machine learning algorithms in a range of real world applications	7

Teaching & Learning Methodology:

The various methods or tools to teach the above subject:

1. Problem - based learning
2. Design Thinking
3. Cooperative-based learning

List of Experiments: Total Hours: 28

Sr. No.	Practical Name
1	Study Prolog.
2	Design a tic-tac-toe game.
3	Explore following python libraries: Numpy, pandas, scikit, Matplotlib etc
4	Perform traveling salesman using python.
5	Perform BFS in python.
6	Study about different Exploratory Data Analysis.

Books Recommended:

1. Elaine Rich And Kevin Knight, “Artificial Intelligence” Tata Mcgraw-Hill
2. Saikat Dull, S. Chjandramouli, Das “Machine Learning”, Pearson
3. Michael Nielsen, “Neural Networks and Deep Learning”, Determination Press
4. Li Deng and Dong Yu, “Deep Learning: Methods and Applications”, Now Publishers Inc

List of Open-Source Software/learning website:

1. https://www.geeksforgeeks.org/machine-learning/
2. https://www.tutorialspoint.com/machine_learning_with_python/index.htm
3. http://neuralnetworksanddeeplearning.com/
4. https://www.youtube.com/watch?v=ua-CiDNNj30

CO-PO-PSO Matrix:

CO.No.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	2			1								2	2	1
CO-2	3	2		1								2	2	1
CO-3	2	3		3	2							1	2	1
CO-4	2	2	3	3	2	2			2		1	2	2	1
CO-5	2	2	3	3	2	2			2		1	2	1	2