

SILVER OAK UNIVERSITY



College of Technology

Bachelor of Technology

Information Technology

Course Name: Advance Artificial Intelligence

Course Code: 1010103416

Semester: 7th

Prerequisite:

Ability to learn new machine learning and deep learning algorithms. Familiarity with programming in Python, Linear Algebra, Probability and Statistics.

Objectives:

1. The objective of the course is to introduce the students with concepts of artificial intelligence and machine learning, and to build the applications using artificial intelligence and machine learning for various domains.
2. Advancing AI aims to enhance foundational knowledge in mathematics, computer science, and machine learning, while developing practical skills in AI tools and applications.
3. It also emphasizes ethical considerations, data privacy, and societal impacts to ensure responsible AI development.

Teaching Scheme:

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

Contents:

Unit	Topics	Teaching Hours	Weightage %
1	Introduction: Concept of AI, history, current status, Pattern Recognition, Deep Learning, Robotics, Problems in AI, Problem characteristics of AI.	3	10
2	Search Algorithms: Depth first and Breadth first search, Heuristic search, Best first search, A* algorithm, Game Playing MiniMax, Alpha-Beta Cut off, 8 puzzle, Tic-Tac-Toe.	6	15
3	Introduction to Machine Learning: What is ML? Overview of Human Learning and Machine Learning, Types of Learning (Supervised Learning, Un-Supervised Learning, Semi-Supervised Learning, Reinforced Learning with application) Applications of Machine Learning, Tools and Technology for Machine Learning. Neural Network: Introduction to neural network, Biological and Artificial Neurons, Types of Activation functions.	7	15
4	Types of NN- CNN, RNN, LSTM, BLSTM, Feedforward, Estimator, Layers, Datasets, training set, validation sets, testing set, evaluation measures: accuracy, precision, recall.	5	10
5	Tensorflow for CNN: Basics of Tensors, Data Input and Preprocessing with Tensorflow, model building, Prediction with Tensorflow, Monitoring and evaluating models using Tensorboard.	7	20

6	Convolutional Neural Networks (CNNs) Architectures: Convolutional Neural Networks, LeNet, AlexNet, VGGNet, GoogLeNet, ResNet, ZF-Net.	7	20
7	GANs: What are GANs? Applications of GANs, Types of GANs, Image In-painting, Image Super Resolution, Human Face Generation, Music Generation.	7	10

Course Outcomes:

Sr. No.	CO Statement	Unit
CO-1	Apply search techniques effectively to solve real-world problems.	1
CO-2	Explain various search algorithms comprehensively.	2
CO-3	Analyze machine learning algorithms and neural networks.	3
CO-4	Design and evaluate deep neural networks and convolutional neural networks (CNNs).	4, 5, 6
CO-5	Develop and implement generative adversarial networks (GANs) and super-resolution techniques.	7

Teaching & Learning Methodology:

The various methods or tools follows by the faculties to teach the above subject are:

1. PPT
2. Video Lectures etc

List of Experiments:

Total Hours: 28

Sr. No.	Practical Name
1	Explore the python libraries.
2	Study about the Exploratory Data Analysis
3	Study about the types of learning with its application.
4	Design an Artificial Neural Network using back propagation.
5	Study about tensorflow and design a tensorflow board.
6	Case Study about CNNs and its architecture.
7	Implement anyone architecture of CNN.
8	Implement CNN for detection.
9	Case study about GANs and its type.
10	Implement anyone GAN.
11	Explore Super Resolution and implement anyone Super Resolution.

Major Equipment/ Instrument(Hardware/Software):

1. Latest configured Computer systems
2. Anaconda
3. Google Colab

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
5. Andy Krig Scott, "Computer Vision Metrics: Survey, Taxonomy, and Analysis", Springer:

Berlin, Germany.

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://towardsdatascience.com/tagged/deep-learning>

CO-PO-PSO Matrix:

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