**Mangaldai College**

**Department of Computer Science & IT**

Certificate Courses on **Introduction to AI**



**Certificate Course on Introduction to AI**

Artificial Intelligence (AI) and Machine Learning (ML) are relevant topics in the technology industry and have a considerable impact on everyday life and business in many ways. We may wonder how Google gives accurate search results, or how Facebook recommends advertisements, or how speech recognition works in smartphones. AI and ML made these things simple. Hence the Computer Science Department organizes the following two certification courses that focus on aspirants from all disciplines who want hands-on experience in solving real-life problems using AI and ML.

**Preamble:**

This course aims to create a strong understanding and skill set on the topics needed before taking up any study on Artificial Intelligence, Machine Learning, and Deep Learning. The course begins with introducing Python fundamentals, then building up the essential machine learning prerequisites, the necessary probabilistic and statistics foundations, and the need for data pre-processing. The study and practice of classical artificial intelligence and machine learning in solving real-world problems are also included in the program.

**Prerequisite**:

Basic knowledge of linear algebra, calculus, and any programming language.

**Course Outcomes:** After the completion of the course the student will be able to

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| **CO 1** | Develop and implement python codes for machine learning algorithms. |
| **CO 2** | Interpret and analyze data using supervised, unsupervised, and reinforcement learning. |
| **CO 3** | Implement algorithms for customized data. |

**Course Contents:**

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|  | **Contents** |
| Unit 1 | Introduction to AI and ML |
| Python Foundations |
| Machine Learning Prerequisites (Including Numpy, Pandas and Linear Algebra) |
| Unit 2 | Reading and Writing Data files (Excel, CSV, Json, audio, image) |
| Data Pre-processing (Standardizing and scaling, Extracting features, Splitting data to train and test sets.) |
| Statistical Foundations (Plots and charts ) |
| Unit 3 | Introducing Probability Distributions (Binomial, Bernoulli, Poisson, Uniform, Gaussian 1D and 2D, Gamma) |
| Supervised Learning-  Naïve Bayes, SKlearn perceptron, , |
| Unit 4 | Logistic Regression, Linear Regression,Nonlinear Regression |
| Support Vector Machine, KNN classifier, Decision Tree, Random Forest |
| Unit 5 | Neural Networks : Representation, Introducing ANN with sklearn |
| Unsupervised Learning- K – Means, Mean Shift, DBSCAN, Hierarchical, Spectral, Fuzzy Clustering, EM and GMM |
| Unit 6 | Reinforcement Learning - Generate Environment, Initialize Q – table, Setup hyperparameters, Training, Using the Q – table after training |
| Evaluation Metrics For AI & ML Models |