



Machine Learning and Data Science

Course Objectives

1. Understand the fundamentals of machine learning, data science, and their real-world applications.
2. Learn data collection, preprocessing, cleaning, and exploratory data analysis techniques.
3. Build and evaluate machine learning models for classification and prediction tasks.
4. Apply supervised and unsupervised learning algorithms to structured datasets.
5. Gain hands-on experience with model performance metrics and optimization techniques.
6. Develop end-to-end data-driven solutions using machine learning workflows.

Prerequisites

- Basic programming knowledge in Python.
- Understanding of mathematics and statistics is helpful but not mandatory.
- Familiarity with data handling concepts is an advantage.

Tools & Environment

- Python programming environment (Jupyter Notebook, Anaconda, or any IDE).
- Libraries such as NumPy, Pandas, Matplotlib, Seaborn, and Scikit-learn.
- Dataset sources such as CSV files or open datasets.
- Google Colab or local development setup.

Beyond Objectives Learning

- Gain practical experience in solving real-world data science problems.
- Learn to analyze datasets and extract meaningful insights for decision-making.
- Develop skills to design, train, and evaluate machine learning models.
- Prepare for roles in machine learning, data analysis, and data science domains.

Sr.	Title	Topic	Objective
1	Introduction to Machine Learning	ML Overview	Understand basic concepts and applications of machine learning
2	Data Science Fundamentals	Data Science Basics	Learn the data science lifecycle and workflow
3	Python for Data Analysis	Python Basics	Use Python for data manipulation and analysis
4	Data Collection Techniques	Data Acquisition	Understand different data sources and formats
5	Data Preprocessing	Data Cleaning	Handle missing values and noisy data



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6	Exploratory Data Analysis	EDA	Analyze data using statistics and visualization
7	Data Visualization	Visualization Tools	Represent data insights using plots and charts
8	Feature Engineering	Feature Extraction	Transform raw data into meaningful features
9	Supervised Learning	Learning Types	Understand labeled data-based learning
10	Linear Regression	Regression Models	Predict continuous values using regression
11	Logistic Regression	Classification Models	Perform binary classification tasks
12	Decision Trees	Tree-Based Models	Learn rule-based model building
13	Ensemble Learning	Random Forest	Improve accuracy using multiple models
14	Unsupervised Learning	Learning Types	Discover patterns in unlabeled data
15	Clustering Algorithms	K-Means	Group similar data points
16	Dimensionality Reduction	PCA	Reduce features while preserving information
17	Model Evaluation	Performance Metrics	Measure model accuracy and effectiveness
18	Model Optimization	Hyperparameter Tuning	Improve model performance
19	Introduction to NLP	Text Processing	Analyze and process textual data
20	ML Project Workflow	End-to-End ML	Build complete machine learning solutions
21	Data Splitting Techniques	Train-Test Split	Prepare data for model training and testing
22	Cross Validation	Model Validation	Improve model reliability and generalization
23	Bias and Variance	Model Analysis	Understand underfitting and overfitting
24	Handling Imbalanced Data	Data Balancing	Improve performance on skewed datasets
25	Feature Scaling	Normalization	Standardize features for better learning
26	Naive Bayes Algorithm	Probabilistic Models	Perform classification using probability



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27	Support Vector Machines	Margin-Based Learning	Classify data using optimal boundaries
28	K-Nearest Neighbors	Instance-Based Learning	Classify data based on similarity
29	Association Rule Mining	Market Basket Analysis	Discover relationships among data items
30	Time Series Basics	Sequential Data	Analyze time-dependent data
31	Introduction to Deep Learning	Neural Networks	Understand multilayer learning models
32	Model Deployment Basics	ML Deployment	Deploy trained models for real-world use
33	Ethics in AI	Responsible AI	Understand ethical considerations in ML
34	Case Study Analysis	Real-World ML	Apply ML concepts to practical problems
35	Final Project Review	Project Evaluation	Evaluate and present machine learning solutions

Minimum Completion Criteria:

- Complete all modules and MCQs
- Attempt weekly marathons
- Submit at least 2 out of 5 projects in the final level
- Attend minimum 80% of lessons

Certificate Details

- Upon successful completion of the Internship, learners will receive a Government- Recognized Certificate from Vidyawan, a registered MSME enterprise (*Udyam Registration No: UDYAM-WB-14-0205610*).



One Month Internship Certificate



Weekly Marathon Participation Certificate



Performance-Based Badge System

- Gold Badge – For Top Performers (90%+ score, completed 4+ projects)
- Silver Badge – For consistent performance (70–89%)
- Copper/Participant Badge – For all learners who complete the program

Contact Information

For queries, registration, or collaboration, feel free to contact us:

Vidyawan – Internship & Skill Development Platform

(A Government-registered MSME – UDYAM-WB-14-0205610)

- Email: contact.vidyawan@gmail.com
- Website: www.vidyawan.in (Get in touch section)
- Location: West Bengal, Ind
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