



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
- Follow us for updates and upcoming internships