

# Data Science Course Syllabus

**Total Duration: 180hrs**

## **Module 1: Core Foundations of Data Science**

### **Chapter 1: Introduction to Data Science**

- What is Data Science
- The Evolution of Data Science
- Importance of Data Science
- Applications of Data Science
- Key Skills Required for Data Scientists
- Future Trends in Data Science

### **Chapter 2: The Data Science Workflow**

- Data Collection
- Data Cleaning and Preparation
- Exploratory Data Analysis (EDA)
- Model Building
- Model Evaluation
- Deployment and Monitoring

### **Chapter 3: Understanding Data Types and Data Structures**

- Data Types
- Data Structures
- Choosing the Right Data Structure

### **Chapter 4: Data Collection Techniques**

- Automated Data Collection
- Primary Data Collection

- Secondary Data Collection
- Real-Time Data Collection
- Ethical Considerations in Data Collection

## **Chapter 5: Data Cleaning Techniques**

- Importance of Data Cleaning
- Common Data Cleaning Techniques
- Tools for Data Cleaning
- Challenges in Data Cleaning
- Best Practices for Data Cleaning

## **Chapter 6: Exploratory Data Analysis (EDA)**

- Importance of EDA
- Steps in Exploratory Data Analysis

## **Chapter 7: Feature Engineering**

- Importance of Feature Engineering
- Types of Features

## **Chapter 8: Model Selection and Evaluation**

- Importance of Model Selection
- Types of Machine Learning Models

## **Chapter 9: Model Deployment and Monitoring**

- Importance of Model Deployment
- Deployment Strategies
- Model Monitoring and Maintenance

## **Module 2: Advanced Topics and Industry Applications**

### **Chapter 10: Advanced Machine Learning Techniques**

- Ensemble Learning
- Deep Learning
- Transfer Learning
- Reinforcement Learning
- AutoML (Automated Machine Learning)

### **Chapter 11: Data Ethics and Privacy in Machine Learning**

- Importance of Data Ethics
- Privacy Concerns in Machine Learning
- Bias and Fairness in Machine Learning
- Regulatory Frameworks for Ethical AI
- Best Practices for Ethical Machine Learning
- Real-World Examples of Ethical and Unethical AI

### **Chapter 12: Data Visualization and Storytelling**

- Importance of Data Visualization
- Principles of Effective Data Visualization
- Types of Data Visualizations
- Tools for Data Visualization
- Common Mistakes in Data Visualization
- Practical Example: Creating a Sales Dashboard

### **Chapter 13: Big Data Concepts and Tools**

- Characteristics of Big Data
- Types of Big Data
- Big Data Tools and Technologies
- Challenges in Managing Big Data

- Applications of Big Data

## **Chapter 14: Machine Learning Concepts and Techniques**

- Introduction to Machine Learning
- How Machine Learning Differs from Traditional Programming
- Key Machine Learning Techniques
- Steps in Building a Machine Learning Model
- Applications of Machine Learning
- Challenges in Machine Learning

## **Chapter 15: Data Visualization Techniques and Tools**

- Importance of Data Visualization
- Types of Data Visualizations
- Tools for Data Visualization
- Designing Effective Visualizations
- Real-World Applications of Data Visualization
- Challenges in Data Visualization

## **Chapter 16: Data Ethics and Privacy in Data Science**

- Understanding Data Ethics
- Privacy Concerns in Data Science
- Ethical Challenges in Data Science
- Regulations and Frameworks for Data Privacy
- Strategies for Ethical Data Practices
- Balancing Ethics and Innovation

## **Chapter 17: Data-Driven Decision Making**

- What is Data-Driven Decision Making?
- The Process of Data-Driven Decision Making

- Tools for Data-Driven Decision Making
- Real-World Applications
- Benefits and Challenges

## **Chapter 18: Data Governance and Security in Data Science**

- What is Data Governance?
- Importance of Data Governance
- Data Security in Data Science
- Regulatory Frameworks and Compliance
- Challenges in Data Governance and Security
- Best Practices for Governance and Security

## **Chapter 19: Data Ethics and Responsible AI**

- What is Data Ethics?
- Importance of Ethics in Data Science
- Challenges in Ethical Data Use
- What is Responsible AI?
- Best Practices for Implementing Responsible AI

## **Chapter 20: Practical Applications and Projects in Data Science**

- Overview of a Complete Data Science Project Workflow
- Real-World Project: House Price Prediction
- Project Ideas for Data Science Practice
- Best Practices for Data Science Projects
- Building a Data Science Portfolio
- Final Thoughts on the Future of Data Science