



"Python for AI"

Duration: 40-hour

Prerequisites:

This course assumes that participants have a foundational understanding of Python.

The focus is on using Python for Artificial Intelligence, including machine learning and deep learning.

This "Python for AI" course provides a comprehensive introduction to key concepts and tools in artificial intelligence, covering machine learning, deep learning, and practical applications in various domains. Adjustments can be made based on the specific needs and pace of the participants.

Module1: Foundations of AI and Python Review

- Session 1: Introduction to AI and Python Recap
 - Overview of AI and its applications
 - Review of Python basics relevant to AI
- Session 2: NumPy and Pandas for Data Manipulation
 - NumPy for numerical operations
 - Pandas for data manipulation and analysis
- Session 3: Data Visualization with Matplotlib and Seaborn
 - Creating plots and charts
 - Visualizing data for AI applications

Module 2: Machine Learning Basics

- Session 4: Introduction to Machine Learning
 - Overview of supervised and unsupervised learning
 - Types of machine learning algorithms
- Session 5: Scikit-Learn Library
 - Using Scikit-Learn for machine learning tasks
 - Hands-on exercises with classification and regression
- Session 6: Model Evaluation and Hyperparameter Tuning
 - Cross-validation and model evaluation metrics
 - Hyperparameter tuning techniques

Module 3: Introduction to Deep Learning

- Session 7: Fundamentals of Neural Networks
 - Basics of neural network architecture
 - Activation functions and layers
- Session 8: Introduction to TensorFlow
 - Overview of TensorFlow and its applications
 - Building and training a simple neural network
- Session 9: Introduction to Keras
 - Keras as a high-level neural networks API
 - Building and training deep learning models with Keras

Module 4: Convolutional Neural Networks (CNNs) and Image Processing

- Session 10: Convolutional Neural Networks (CNNs)
 - Understanding CNN architecture
 - Image classification with CNNs
- Session 11: Image Processing with OpenCV
 - Introduction to OpenCV library
 - Image manipulation and processing
- Session 12: Hands-on Project: Image Classification
 - Applying CNNs and OpenCV for an image classification project

Module 5: Natural Language Processing (NLP)

- Session 13: Introduction to NLP
 - Basic concepts in natural language processing
 - Text preprocessing and tokenization
- Session 14: NLP with NLTK and SpaCy
 - Utilizing NLTK and SpaCy libraries
 - Named Entity Recognition (NER) and sentiment analysis
- Session 15: Hands-on Project: Text Classification
 - Applying NLP techniques for text classification

Module 6: Reinforcement Learning and AI Ethics

- Session 16: Introduction to Reinforcement Learning
 - Basics of reinforcement learning
 - Q-learning and Markov Decision Processes
- Session 17: Hands-on Project: Reinforcement Learning
 - Implementing a simple reinforcement learning algorithm
- Session 18: Ethical Considerations in AI
 - Discussion on AI ethics
 - Responsible AI development

Module 7: Advanced Topics in AI

- Session 19: Transfer Learning
 - Understanding transfer learning in AI
 - Application of pre-trained models
- Session 20: Generative Adversarial Networks (GANs)
 - Introduction to GANs
 - Generating synthetic data with GANs
- Session 21: AI in Real-world Applications
 - Industry use cases and case studies
 - Challenges and opportunities in AI



Module 8: Final Project and Review

- Session 22: Capstone AI Project
 - Applying AI techniques to a real-world problem
 - Project presentation and discussion
- Session 23: Review and Q&A
 - Recap of key AI concepts
 - Addressing participant questions and concerns
- Session 24: Course Conclusion and Certificates
 - Course summary
 - Certificate distribution