Deep Learning Fundamentals for Data Analysis Training Course

Professional Development Training Course Outline

Category	Research and Data Analysis	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Deep Learning Fundamentals for Data Analysis Training Course is meticulously designed to equip learners with foundational and advanced concepts of deep learning tailored specifically for impactful data analysis. This hands-on, instructor-led program delves into neural networks, supervised and unsupervised learning, convolutional networks, and real-world data science applications. The course integrates theory and practical sessions to help participants understand how to optimize, train, and deploy deep learning models for classification, prediction, and decision-making tasks. Using Python and popular deep learning frameworks such as TensorFlow and PyTorch, learners will gain practical experience in applying these models to real datasets in domains like healthcare, finance, marketing, and technology.

With increasing demand for skilled professionals in AI, machine learning, and data science, this course ensures participants remain competitive by focusing on trending industry tools and techniques. Learners will not only develop a deep understanding of neural architectures but also grasp how to interpret, evaluate, and communicate data-driven insights using deep learning. This program is ideal for professionals, researchers, analysts, and students aiming to boost their expertise in AI-powered analytics and gain a strong edge in today’s data-centric world.

Programme Curriculum

Deep Learning Fundamentals for Data Analysis Training Course

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Course Objectives

1. Understand the core principles of deep learning and its role in modern AI development.
2. Explore the architecture of artificial neural networks (ANNs) and backpropagation.
3. Apply Python for deep learning using libraries like TensorFlow, Keras, and PyTorch.
4. Implement Convolutional Neural Networks (CNNs) for image classification.
5. Utilize Recurrent Neural Networks (RNNs) and LSTMs for sequence data.
6. Develop unsupervised deep learning models like autoencoders.
7. Master data preprocessing and feature engineering for deep learning.
8. Evaluate model performance using metrics like accuracy, precision, recall, and F1-score.
9. Integrate deep learning into data pipelines for end-to-end solutions.
10. Gain hands-on experience with real-world datasets from various industries.
11. Learn to visualize model training and results using tools like TensorBoard and Matplotlib.
12. Implement model tuning, optimization, and regularization techniques.
13. Understand ethical considerations and bias mitigation in AI models.

Target Audience

1. Data Analysts and Data Scientists
2. AI/ML Engineers and Developers
3. Research Scholars in Computer Science
4. Software Engineers seeking AI specialization
5. IT Professionals transitioning to AI roles
6. Business Analysts with data-driven goals
7. Undergraduate and Postgraduate students
8. Professionals in healthcare, finance, and tech sectors

Course Duration: 5 days

Course Modules

Module 1: Introduction to Deep Learning

- Overview of AI, Machine Learning, and Deep Learning
- History and evolution of deep neural networks
- Types of learning: supervised, unsupervised, reinforcement
- Mathematical foundations (linear algebra, calculus basics)
- Tools and platforms overview (Python, TensorFlow, Keras)
- **Case Study:** Predicting stock prices using basic ANN

Module 2: Neural Network Architecture

- Structure of a neuron and layers
- Activation functions and loss functions
- Forward propagation and backpropagation explained

- Building simple models in Keras
- Overfitting and underfitting
- **Case Study:** Customer churn prediction using ANN

Module 3: Data Preparation and Feature Engineering

- Cleaning and preprocessing datasets
- Normalization, standardization, encoding
- Feature extraction and dimensionality reduction
- Handling imbalanced datasets
- Data augmentation techniques
- **Case Study:** Preprocessing clinical trial data for cancer research

Module 4: Convolutional Neural Networks (CNNs)

- Concept and structure of CNNs
- Image convolution, pooling, padding
- Implementing CNNs using TensorFlow/Keras
- Transfer learning with pre-trained models
- Evaluation metrics for image models
- **Case Study:** Object detection in traffic surveillance systems

Module 5: Recurrent Neural Networks (RNNs) and LSTMs

- Sequence modeling and RNN structure
- Vanishing gradients and LSTM solutions
- Application to time-series forecasting
- NLP applications: text classification, sentiment analysis
- Attention mechanisms overview
- **Case Study:** Predicting patient admission rates using time-series hospital data

Module 6: Unsupervised Learning and Autoencoders

- Clustering vs. dimensionality reduction
- Introduction to autoencoders and architecture
- Anomaly detection using unsupervised learning
- Hands-on with PCA and t-SNE
- Visualization of learned features
- **Case Study:** Credit card fraud detection using autoencoders

Module 7: Model Optimization and Evaluation

- Regularization techniques: dropout, L1/L2
- Learning rate scheduling, batch normalization
- Model evaluation techniques
- Confusion matrix, ROC-AUC curve
- Hyperparameter tuning with Grid Search
- **Case Study:** Tuning CNN model for facial recognition accuracy

Module 8: Ethics, Interpretability & Deployment

- Explainable AI (XAI) techniques
- Bias, fairness, and accountability in AI
- Model compression and deployment strategies
- Exporting models to ONNX, TensorFlow Lite
- Introduction to cloud deployment (AWS, GCP)

- **Case Study:** Deploying a deep learning model for diabetes detection via web API

Training Methodology

- Interactive instructor-led sessions
- Hands-on coding exercises and labs
- Guided mini-projects for each module
- Group discussions and Q&A
- Use of real-world datasets for case studies
- Final capstone project with feedback and evaluation

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

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