**INTRODUCTION TO DEEP LEARNING**

***1. Introduction to Neural Networks***

* Overview of artificial neural networks (ANNs)
* Basic structure: neurons, layers, activation functions

***2. Deep Neural Networks***

* Understanding deep architectures
* Deep vs. shallow networks

***3. Training Deep Neural Networks***

* Loss functions and optimization
* Backpropagation and gradient descent

***4. Popular Architectures***

* Convolutional Neural Networks (CNNs) for image data
* Recurrent Neural Networks (RNNs) for sequential data
* Introduction to Transformers for NLP and sequence tasks

***5. Applications of Deep Learning***

* Computer vision: object detection, image classification
* Natural language processing: text generation, sentiment analysis
* Other domains: reinforcement learning, generative models

***6. Challenges and Considerations***

* Overfitting and regularization techniques
* Ethical considerations in deep learning
* Hardware and computational requirements

***7. Hands-on Projects***

* Implementing a simple neural network with TensorFlow or PyTorch
* Building a basic CNN for image classification
* Training an RNN for text generation