Course Contents

- **Module 1:** Basics and History of Deep Learning Models (4hrs)
  - McCulloh Pitts Neuron, Perceptron learning, Multi-layer Perceptron, Back Propagation

  Module 2: Optimization and Regularisation (6hrs)
  - Gradient Descent, Stochastic Gradient Descent, Adagrad, Adadelta, RMSProp, Adam, learning rate schedulers, Bias Variance Tradeoff, L2 regularization, Early stopping, Dataset augmentation, Dropout

  Module 3: Convolution neural network (16hrs)
  - Convolution kernel, pooling, Forward and Backward pass in CNN, Weight initialization methods, LeNet, AlexNet, VGGNet, ResNet, Inception, ConvNext, Autoencoders and various types of autoencoders, Parameter calculation

  Module 4: Sequence Modelling (8hrs)
  - Recurrent neural networks, Long short-term memory Cells, Vanishing and Exploding Gradients, Forward and Backward pass, Transformers: Attention mechanism

  Module 5: Special Topics in Deep Learning (6hrs)
  - Generative Adversarial Networks, Transfer Learning, Meta-Learning, Graph Convolution Networks, Uncertainty and Bayesian Networks