

Week	Topics Covered	Assignment
1	Generative Modeling – Introduction, Bayesian probability, Statistical distributions, Gradient Descent, Optimization function, Generative models for text, images, and structured data, Generative probabilistic models, word embeddings, Natural Language Processing (NLP)	Python coding refresher
2	Python and machine and deep learning libraries in Scikit, Keras/TensorFlow, Hugging Face, and Pytorch, NLTK, Spacy, Gensim	Python coding with libraries
3	Neural Networks, Convolutional Neural Network (CNN), Residual Networks (ResNet)	Image classification
4	Generative Adversarial Network (GAN) introduction, Vanilla GAN, Min-Max optimizer, Conditional GAN (CGAN), Deep Convolutional GAN (DCGAN), CycleGAN	Image generation
5	Large Language Modeling (LLM), Prompt Engineering, Fine Tuning, OpenAI and Google LLMs	ChatGPT assignment
6	Traditional ML for NLP - Naïve Bayesian Classifier (NBC), Latent Dirichlet Allocation (LDA), Latent Semantic Analysis (LSA)	ChatGPT and ML for text classification
7	Transformers, Bidirectional Encoder Representations from Transformers (BERT), Supervised, unsupervised, and reinforcement learning for Transformers	ChatGPT group project (2 weeks)
8	QUIZ on Generative modeling	ChatGPT group project (contd.)
9	Stacked Autoencoder, Variational Autoencoder (VAE), Vector Quantized VAE (VQVAE), Vector Quantized GAN (VQGAN)	VQGAN assignment
10	Sequential models, RNN, LSTM, Autoregressive GAN, PixelCNN	DALL-E image generation
11	Text to Image generation, Diffusion Models, Caption generation	Text to image generation
12	Structured data generation, Bayesian Belief Networks (BN), Gaussian Mixture Model (GMM), Hidden Markov Model (HMM)	BN modeling assignment