# Data Science Course outline

#### Week 1: Introduction to Data Science and Advanced Data Wrangling/EDA

* **Day 1: Overview of Data Science**
  + What is Data Science?
  + Roles in Data Science (Data Scientist, Data Analyst, ML Engineer)
  + Overview of the Data Science Lifecycle
* **Day 2: Introduction to Data Wrangling**
  + Data Types and Structures
  + Data Cleaning Techniques
  + Handling Missing Data
* **Day 3: Exploratory Data Analysis (EDA)**
  + Descriptive Statistics
  + Data Visualization Tools (Matplotlib, Seaborn)
* **Day 4: Data Preprocessing**
  + Feature Engineering
  + Data Transformation Techniques
* **Day 5: Advanced Data Wrangling with Pandas**
  + Advanced Data Manipulation Techniques
  + Working with Dates and Times

#### Week 2: Introduction to Machine Learning

* **Day 1: Machine Learning Basics**
  + What is Machine Learning?
  + Supervised vs. Unsupervised Learning
* **Day 2: Regression Analysis**
  + Linear Regression
  + Multiple Regression
* **Day 3: Classification Techniques**
  + Logistic Regression
  + K-Nearest Neighbors
* **Day 4: Model Evaluation and Validation**
  + Cross-Validation
  + Evaluation Metrics (Accuracy, Precision, Recall)
* **Day 5: Feature Selection Techniques**
  + Feature Importance
  + Dimensionality Reduction (PCA)

#### Week 3: Advanced Machine Learning

* **Day 1: Ensemble Methods**
  + Random Forest
  + Gradient Boosting
* **Day 2: Clustering Techniques**
  + K-Means Clustering
  + Hierarchical Clustering
* **Day 3: Time Series Analysis**
  + Introduction to Time Series Forecasting
  + ARIMA Models
* **Day 4: Introduction to Deep Learning**
  + Neural Networks Basics
  + Deep Learning Frameworks (TensorFlow, Keras)
* **Day 5: Natural Language Processing (NLP)**
  + Text Processing
  + Sentiment Analysis

#### Week 4: MLOps and Capstone Project

* **Day 1-2: Introduction to MLOps**
  + Overview of MLOps
  + Data Drift, Monitoring, and Detection
* **Day 3: Introduction to AWS for Data Science**
  + Overview of AWS Services for Data Science (S3, EC2, SageMaker)
  + Setting Up an AWS Account
  + Data Storage and Management with S3
* **Day 4: Model Deployment with AWS SageMaker**
  + Building and Training Models on SageMaker
  + Deploying Models as Endpoints
* **Day 5: Capstone Project and Career Preparation**
  + Capstone Project: Incorporate MLOps and AWS for Deployment
  + Building a Data Science Portfolio
  + Resume and LinkedIn Optimization
  + Interview Preparation (Mock Interviews, Technical Questions)

Week 5: Optional topics

1. Recommender systems
2. Questions from students and clarify topics, follow up
3. Gen AI Intro (LLM)