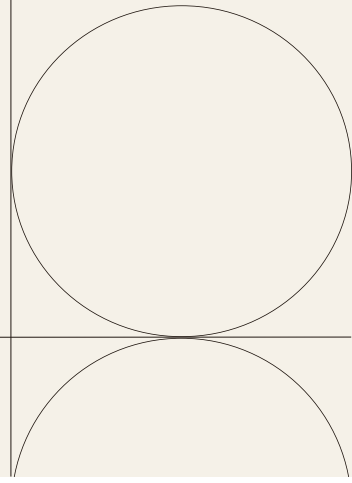# AYOMI
AI - Classes

DATA Science (Syllabus)

1. Introduction to Data Science	- What is Data Science? - Data Science vs. Machine Learning vs. Artificial Intelligence - Applications of Data Science - Roles and Responsibilities of a Data Scientist
2. Mathematics and Statistics for Data Science	- Linear Algebra (vectors, matrices, eigenvalues/eigenvectors) - Probability Theory (distributions, Bayes' theorem) - Descriptive Statistics (mean, median, variance, etc.) - Inferential Statistics (hypothesis testing, p-values, confidence intervals) - Sampling Methods and Estimations - Regression Analysis (simple and multiple)
3. Programming for Data Science	- Introduction to Python or R Python Libraries: - NumPy, Pandas, Matplotlib, Seaborn - R Libraries: ggplot2, dplyr, tidyr - Data Structures (lists, arrays, dataframes) - Functions, Loops, and Conditional Statements - File Handling (reading, writing data from CSV, JSON, SQL)
4. Data Preprocessing	- Data Cleaning (handling missing data, outliers) - Data Transformation (scaling, encoding, normalization) - Feature Engineering (creating new features, feature selection) - Text Data Processing (tokenization, stopwords, TF-IDF)
5. Exploratory Data Analysis (EDA)	- Data Visualization (histograms, boxplots, scatterplots, etc.) - Correlation and Covariance - Identifying trends and patterns - Summary Statistics - Using Matplotlib, Seaborn, and Plotly for visualizations
6. Machine Learning	- Supervised Learning: - Linear Regression - Logistic Regression - Decision Trees and Random Forests - Support Vector Machines (SVM) - k-Nearest Neighbors (k-NN) - Neural Networks

- **Unsupervised Learning:**
  - Clustering (K-means, Hierarchical)
  - Dimensionality Reduction (PCA, t-SNE)
- Model Evaluation (cross-validation, metrics like accuracy, precision, recall, F1 score)

7. Deep Learning	- Introduction to Neural Networks - Backpropagation and Gradient Descent - Convolutional Neural Networks (CNNs) - Recurrent Neural Networks (RNNs) and LSTMs - TensorFlow and Keras
8. Natural Language Processing (NLP)	- Text Preprocessing (tokenization, lemmatization, stemming) - Bag-of-Words, TF-IDF, Word2Vec - Sentiment Analysis - Named Entity Recognition (NER) - Text Classification and Clustering
9. Big Data and Data Engineering	- Introduction to Big Data Tools (Hadoop, Spark) - Distributed Data Processing - Working with NoSQL Databases (MongoDB, Cassandra) - Data Pipelines and ETL (Extract, Transform, Load) - Cloud Platforms (AWS, Azure, Google Cloud)
10. Model Deployment and Production	- Model Deployment using Flask/Django - Introduction to REST APIs - Cloud Deployment (AWS, GCP, Heroku) - Continuous Integration and Continuous Deployment (CI/CD) - Model Monitoring and Maintenance
11. Capstone Project	- Working on a real-world dataset - Applying Data Science techniques to solve a business problem - Presenting results and insights using visualizations
Optional: Special Topics in Data Science	- Reinforcement Learning - Advanced Deep Learning (GANs, Transformers) - Time Series Analysis - Recommender Systems