Pepsi Co. Training Syllabus

1. **Day 1 - Demystifying Artificial Intelligence - Lecture**
    a. AI in our everyday lives
        i. Recommendation systems (netflix, youtube, etc)
        ii. computer vision (self driving, object detection, segmentation analysis)
        iii. natural language understanding (siri, alexa, GPS, google translate, email spam detection, etc)
        iv. Job/college/loan/credit applications
        v. Fraud detection
        vi. Optimizing store inventory/shelving/staffing
    b. What is AI?
        i. Computers + Math + Data
        ii. How does it work?
    c. Data
        i. What is data
        ii. Data sources
        iii. Data storage
    d. Subsets of AI
        i. Supervised vs Unsupervised vs Reinforcement Learning
        ii. Machine learning
        iii. Deep learning
        iv. Reinforcement learning
    e. Introduction to ML algorithms
        i. What tasks are associated with what algorithms
        ii. Flavors of ML algorithms
        iii. Examples of ML algorithms
    f. Identifying & Productizing ML use-cases
        i. Consistent data
        ii. Large volume
        iii. Interactive vs Non-Interactive
        iv. Single Record vs Batch
    g. Conclusion - Day 1 - Quiz

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2. **Day 2 - Machine Learning Algorithm Foundations - Lecture**
    a. Establish Term Glossary
    b. The Artificial Neuron
    c. Open-source software

    i. Layers of auto-ml (code a network/keras & torch/auto-ml)
  d. The components of ML algorithms (rudimentary concepts)
  e. Walkthrough an example with real data
  f. Conclusion - Day 2 - Quiz

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3. **Day 3 - Functions, Data Structures & EDA - Jupyter Notebook**
   a. Data Structures
   b. Basic Functions
   c. Intermediate Functions
   d. Working with Datasets
      i. Reading in different data
      ii. Examining features
      iii. Visualizations
   e. Conclusion - Day 3 - Quiz

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4. **Day 4 - Feature Selection & Feature Engineering - Jupyter Notebook**
   a. Feature Selection
      i. Choosing relevant features for your ML model
   b. Feature Engineering
      i. Process of cleaning data for a ML model
   c. Data preparation
      i. Putting it all together
      ii. Preparing data to train a ML model
   d. Conclusion - Day 4 - Quiz

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5. **Day 5 - Basic ML Algorithms (Regression) - Jupyter Notebook**
   a. Regression
      i. Different types
      ii. How it works
      iii. Examples
   b. Interpreting model results
      i. Accuracy
      ii. ROC/AUROC/F1/recall/precision/etc
   c. Conclusion - Day 5 - Quiz

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6. **Day 6 - Intermediate ML Algorithms - Trees/Ensemble Methods (RFs) - Jupyter Notebook**
    a. Decision Trees
    b. Random Forest
    c. Hyper-Parameters & Model tuning
    d. Conclusion - Day 6 - Quiz

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7. **Day 7 - Advanced ML Algorithms - Neural Networks (ANNs) - Jupyter Notebook**
    a. The basic, forward ANN
        i. The artificial neuron
        ii. The network
    b. The CNN
    c. The RNN
    d. Open-source models
    e. Transfer Learning
    f. Conclusion - Day 7 - Quiz

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8. **Day 8 - E2E Build - Putting It All Together - Jupyter Notebook**
    a. Given a dataset, experiment with different methods & models.
    b. Develop the end-to-end process from scratch and choose the optimal solution
        i. Feature Selection / Eng
        ii. Define the task and experiment with different algorithms
        iii. Tune the model
    c. Create interpretable visualizations

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9. **Day 9 - Productization - Infrastructure - Lecture + VSCode**
    a. Different types of deployment
        i. Interactive vs non-interactive (client facing or not)
    b. The client facing API
    c. The internal system
    d. Things to consider

    i. Model drift
    ii. Model re-training
    iii. Throughput & latency
e. Cloud infra
    i. azure/aws/gcp/redis/etc
    ii. Worker jobs
f. Conclusion - Day 9 - Quiz

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10. Day 10 - Productization - Deployment - Lecture + VSCode

a. Hosting, and deployment of the API
b. Moving from dev environment to prod environment!
    i. stress-testing
    ii. Secret keys
    iii. Modularize code
    iv. Encryption
c. Conclusion - Day 10 - Quiz