RATHINAM | RAISE SMART — Raising you Smarter for the New Gen Era

DEPARTMENT OF EMERGING AND SPECIALIZED LEARNING

GEN AI – DATA SCIENTIST

End-to-End ML, DL & Project-Based Learning: 20 Days of Hands-On Industry-Focused Training			
Module	**Day**	**Session**	**Topics**
Foundation of Python	1	FN	Python
		AN	
Machine Learning Foundations to Advanced Applications			
Core Machine Learning & Mathematical Foundations	2	FN	What is ML? (Supervised vs Unsupervised vs Reinforcement), Real-world ML Applications, GitHub setup (Version Control)
		AN	Linear Algebra (Vectors, Matrices, Transformations), Descriptive Statistics, Probability Basics (Conditional Probability, Bayes Theorem) + NumPy Hands-on
Python for Data Science & Exploratory Data Analysis (EDA)	3	FN	Python Libraries for ML (NumPy, Pandas, Matplotlib, Seaborn) + EDA, Preprocessing and Visualization
Supervised Learning – Regression Models		AN	What is a Model? Target vs Features, Overfitting vs Underfitting + Linear Regression (Theory + Hands-on), Evaluation Metrics
	4	FN	Regression Metrics, Project: Coffee Shop Sales Prediction + Streamlit Deployment
Supervised Learning – Classification Models (Part 1)		AN	Logistic Regression + Evaluation Metrics, Mini Project: Heart Disease Classification
	5	FN	K-Nearest Neighbors (KNN)
Supervised Learning – Classification Models (Part 2)		AN	Naive Bayes Algorithm (Theory + Hands-on), Mini Project: Spam Classifier + Streamlit Deployment
	6	FN	Decision Tree (Gini vs Entropy) + Flask App
Supervised Learning – Ensemble Methods (Bagging-Based)		AN	Random Forest (Ensemble Learning) + Project: House Price Prediction
Supervised Learning – Margin-Based Models	7	FN	Support Vector Machine (SVM)
		AN	Bagging Algorithm, AdaBoost
Supervised Learning – Boosting Algorithms (Ensemble Techniques)	8	FN	Gradient Boosting
		AN	XGBoost Algorithm
Unsupervised Learning – Clustering Techniques (Part 1)	9	FN	K-Means Clustering, Elbow Method, Find Optimal no. of Clusters + Customer Segmentation Project
Unsupervised Learning – Clustering Techniques (Part 2) + Unsupervised Learning – Dimensionality Reduction Techniques		AN	Hierarchical Clustering + Dimensionality Reduction (PCA) + Real-Time Data Application
Supervised Learning – Model Evaluation & Validation Techniques	10	FN	Bias–Variance Tradeoff
		AN	Cross Validation (K-Fold)
Unsupervised Learning – Density-Based Clustering (DBSCAN)	11	FN	DBSCAN Algorithm (Density-Based Clustering)
Model Optimization – Hyperparameter Tuning		AN	Hyperparameter Tuning (GridSearchCV, RandomizedSearchCV)

Model Optimization – Feature Engineering & Selection (Part 1)	12	FN	Feature Selection (Filter & Wrapper Methods)
Model Optimization – Feature Engineering & Selection (Part 2)		AN	Feature Selection (Embedded Methods - L1&L2) + Feature Reduction (PCA & ICA for Unsupervised Data)
Capstone Project – Supervised Learning	13	FN	Capstone Project: Movie Success Prediction (Data → Preprocessing → Model → Evaluation) + Model Selection & Training, Model Fine-Tuning + Model Deployment (Streamlit / Flask)
Final Capstone Evaluation & Presentation		AN	Final Capstone Presentation, Evaluation, and Feedback
Deep Learning with TensorFlow & Keras			
Neural Network Basics	14	FN	NN Fundamentals – Basics of how artificial neural networks work.
		AN	NN Math – Core mathematical concepts behind neural networks.
Training & Practical ANN	15	FN	Training the NN – How neural networks learn using optimization techniques.
		AN	Practical ANN – Implementing Artificial Neural Networks in real-world tasks.
Evaluation & CNN Basics	16	FN	Evaluation & Regularization – Improving model accuracy and avoiding overfitting.
		AN	CNN Fundamentals – Introduction to Convolutional Neural Networks for images.
Practical & Advanced CNN	17	FN	Practical CNN – Building and training CNN models for vision problems
		AN	Advanced CNN – Modern deep CNN architectures and enhancements.
RNN Basics & Advanced RNN	18	FN	RNN Fundamentals – Understanding Recurrent Neural Networks for sequence data.
		AN	Advanced RNN – LSTMs, GRUs, and advanced sequence modeling techniques.
NLP & Advanced DL	19	FN	NLP & Embeddings – Converting text to vectors and applying NLP techniques.
		AN	Advanced Topics – Transformers, attention, and current deep learning advances.
Project & Deployment	20	FN	Project Walkthrough – Step-by-step implementation of a complete DL project.
		AN	Deployment & Review – Deploying models and reviewing performance end-to-end.

Weekly Review Plan (Final Week)
Common ML Interview Questions
Data Science Scenario-Based Q&A
Mock Interview (Self / Peer)
MCQ & Assessment
Debate / Group Discussion
Resume Finalization
LinkedIn Profile Touch-Up
Build Portfolio Website (Optional)
Add Final GitHub Projects
Project Presentation