NIAI

NETSOL Institute of AI

AI/ML Training Program

AI/ML Hands-on Training & Real-World Skills to Prepare for the Future

1. AL/ML Technical Curriculum Breakdown

Course Name:	**Artificial Intelligence Machine Learning - Deep Learning**
Course Duration:	3 Months (12 Weeks)
No. Of Days per week:	4 Days per week (Course only)
Class Hours	3 hours per class
Total In-Class Credit hours	144

Module	Content Breakdown
1. Foundation	Unit 1: Mathematics for AI/ML: Linear algebra (vectors, matrices), calculus (derivatives, gradients), basic optimization.
	Unit 2:Probability & Statistics: Probability theory, Bayes' theorem, descriptive statistics, inference.
	Unit 3: Programming Foundations: Core Python (syntax, functions, loops), libraries (NumPy, Pandas, Matplotlib, Scikit-learn).
	Quiz and Tasks
	Assignment: Write Python scripts for basic data analysis. - Simulate probability concepts and visualize math operations using NumPy. - Explore AI applications through case studies.
2. AI/ML and Cloud Platforms	Unit 1:AI Basics and Real-world Applications: Use cases of AI and ML in industries such as healthcare, finance, e-commerce, and transportation.
	Unit 2:AI pipeline
	Unit 3: AI Cloud Ecosystem - Cloud: Core ML Services - Cloud: Development Tools
	Quiz and Tasks
	Assignment: Setting up cloud Environment and related tools
Module	**Content Breakdown**

3. Data Pipeline: Data Preparation and Feature Engineering - Data Analysis	Unit 1: Data Preprocessing: Data collection, cleaning, transformation, encoding, scaling.
	Unit 2: Data Engineering with cloud
	Unit 3: Data Pipelines: ETL processing, stream and batch handling, automation.
	Quiz and Tasks
	Assignment (1.5 hr per week)**:** - Build an end-to-end data pipeline using BigQuery ML and Dataflow. - Perform data wrangling and transformation using cloud tools.
4. Basic AI and ML	Unit 1: Supervised Learning: Regression (linear/logistic), classification (SVM, KNN, naive Bayes).
	Unit 2: Decision trees, and Ensemble models
	Unit 3: Perceptron Learning, and Neural Networks
	Unit 4: Model Selection: Bias-variance tradeoff, evaluation metrics, confusion matrix.
	Quiz and Tasks
	Assignment (1.5 hr per week)**:** Build and train models. - Tune hyperparameters - Compare model types on a small dataset.
5. Advanced AI and ML	Unit 1: Deep Learning Models: CNNs, RNNs, transformers, attention models.
	Unit 2:Optimization Techniques: Regularization, dropout, learning rate tuning.
	Unit 3: Cloud-Based Training: TPU/GPU distribution on GCP.
	Quiz and Tasks
	Assignment: - Fine-tune pre-trained models. - Perform transfer learning. - Run distributed training.
6. Unsupervised Learning	Unit 1: Clustering K-Means, DBScan etc.
	Unit 2: Dimensional Reduction
	Quiz and Tasks
	Assignment: - Define, develop and analyse unsupervised models.
Module	**Content Breakdown**

8. ML Pipeline and Automation	Unit 1: MLOps, Principles, Lifecycle, Architecture
	Unit 2: Design and Development
	Unit 3: MLOps Best Practices: CI/CD, versioning, dataset/model tracking
	Unit 4: Deployment
	Unit 5: ML Workflow Automation: Kubeflow Pipelines, Cloud Composer.
	Quiz and Tasks
	Assignment: Hands-On: - Deploy and automate ML pipelines for real-time predictions.
9. Model Optimization, Performance Tuning, Deployment	Unit 1: Model Optimization: Pruning, quantization, knowledge distillation.
	Unit 2:Performance Monitoring: Model drift, accuracy, retraining strategies.
	Quiz and Tasks
	Assignment: - Optimize an image recognition model using TensorRT. - Monitor and retrain model using Vertex AI tools.
11. Responsible and Explainable AI	Unit 1: Bias Detection: Fairness indicators, model evaluation across demographics.
	Unit 2:Explainability: SHAP, LIME, What-If Tool (WIT), Physics Aware AI.
	Unit 3: Ethical AI: Google frameworks for responsible ML.
	Quiz and Tasks
	Assignment: - Evaluate model bias. - Apply interpretability tools to explain predictions.
12. Generative AI	Basics, Technologies and Applications

Module	**Content Breakdown**

13. Capstone Project	Project Runs Parallel focusing on Real-World AI Applications: Design, build, and deploy an AI/ML solution. Project Examples: Medical diagnostics, fraud detection, recommender system, NLP etc. Hands-On: Build an end-to-end ML pipeline on cloud. Present and evaluate the project outcome

Notes:

Activities & Tasks	All Tasks are as per NAVTTC Course Annexure-I, however Quiz, assignments and Capstone Project are additional
Motivational Lecture	We have a separate Soft Skill program which will be conducted every week on Soft Skill day. An Outlined draft of our Soft Skills program is attached Separately

Item	NIAI	Remarks
Course Duration	3 Months (12 Weeks)	All NAVTTC topics covered + Corporate development Soft Skills Program
Total Class Days	5 Days	4 days/week (Course) + 1day for soft skills.
In-Class Hours	3 hours/day	Content coverage sustained
Total In-Class Hours	144 hours (Excluding notional hours)	In-Class subject: 144 hours In-Class Soft Skills: 24 hours Project work: Approx. 100 hours (guided independent and team-based projects)

2. Soft Skills & Leadership Modules

"Delivered by NIAI's (NETSOL Institute of Artificial Intelligence) Organizational Development experts, these modules enhance corporate readiness and professional competencies:"

- Building Future Ready Tech Leaders
- Communication Improvement Program
- Teamwork & Collaboration
- Emotional Intelligence & Empathy

This stream adds 2 hours/week across 12 weeks (24 hours), reinforcing Professionalism and Business Skills competencies vital for workplace integration.