

ByteXL-MRECW AInstack-GenAI-AgentAI-IoT Innovation Readiness Training (38 Days)				
Days 1-23: Foundation and Core Learning				
Day	Topic	Description	Key Points	Case studies/Mapped Topics
Day 1	Python&Java Programming & Web Technologies	Establish core programming skills with Python & Java and version control with Git, web development, including structuring content with HTML, styling with CSS,	Python syntax, data types, control flow, functions, OOP, Git commands, HTML structure, CSS styling, DOM manipulation,	Programming & Web Technologies
Day 2	JavaScript, React, Node.js Fullstack	Covers JavaScript , DOM manipulation, React components & hooks, client-side routing, and backend development with Node.js & Express	Variables, Functions, DOM Events, React Props & State, Hooks (useState, useEffect), React Router, Express Routing, Middleware, REST API	ES6+, Virtual DOM, SPA, API Development, Asynchronous JS, JSON
Day-3	JavaScript	JS DATA TYPES, OPERATORS IN JS, CONDITIONALS, LOOPS, Functions and Arrays, Objects and Timing Events, DOM Events in JavaScript, JSON & Fetch API	Javascript basics, Functions and Arrays, Objects and Timing Events, DOM Events in JavaScript, JSON & Fetch API	Case study: Calculator App
Day-4	ReactJS	React Basics & JSX useState & Event Handling Forms in React Routing in React React hooks, API Integration	React Basics & JSX useState & Event Handling Forms in React Routing in React React hooks	case study: Ecommerce App
Day-5	Nodejs	What is Express?, Creating server, Routing (GET, POST), Middleware, Handling JSON, Route parameters, Query strings, Express Router, Custom middleware, Logging requests, DB:SQL	Introduction to Node.js, Modules & Asynchronous JS, Express.js Basics, Express Routing & Middleware DB:SQL	Case study: Placement Cell
Day 6	Python frameworks Django and Restfu API	Django framework and Rest API	- Backend frameworks: Django (Python), FastAPI (Python), NodeJS (JavaScript) - Use cases and differences	Case study: Personal Blog Platform with API
Day 7	Data Science Essentials	Focus on data manipulation, analysis, and visualization using Python's powerful libraries. Understand how to prepare and explore data, which is crucial for any AI/ML application.	Pandas DataFrames, NumPy arrays, data wrangling, EDA, data visualization (Matplotlib, Seaborn).	Case study: E-commerce Sales Analytics Dashboard
Day 8	Machine Learning-supervised	core concepts of traditional machine learning, including supervised learning algorithms, model training, and evaluation metrics.	Supervised learning, classification, regression, model evaluation (accuracy, precision, recall, F1-score, R-squared, MSE), cross-validation, feature scaling.	Case study: Customer Churn Prediction System
Day 9	Machine Learning-unsupervised	unsupervised learning-Clustering, PCA,	use K-means clustering to segment customers by purchase behavior and association rules (Apriori algorithm) to identify frequently bought product combinations for cross-selling strategies	E-commerce Customer Segmentation & Market Basket Analysis
Day 10	Deep Learning & Neural Networks	Cover the neural networks, their architecture, and the training process. Focus on fundamental concepts without advanced CNN architectures.	Perceptrons, multi-layer perceptrons, activation functions, forward/backward propagation, loss functions, optimizers, neural network concepts.	Case study: Image Classification for Plant Disease Detection
Day 11	Natural Language Processing (NLP)	Explore how AI processes human language, from text analysis to the architecture and applications of Large Language Models.	Text preprocessing, embeddings, sentiment analysis, Transformer architecture, attention mechanism, pre-training vs. fine-tuning LLMs, Q&A systems.	Case study: Sentiment Analysis for Product Reviews
Day 12	Generative AI	the concepts of generative models for creating new content	GANs, VAEs, Diffusion Models (conceptual), prompt engineering, synthetic data, data fusion	Case study: Smart Research Assistant Agent
Day 13	Multimodal AI	AI systems integrate information from multiple modalities	cross-modal learning, image captioning, video understanding	Case study: Scalable Image Recognition Service
Day 14	LLM	Build a customer support chatbot using fine-tuned LLMs with RAG (Retrieval Augmented Generation) for domain-specific responses	• Fine-tuning and prompt engineering- • RAG architecture implementation	Case study: Real-time Social Media Analytics Pipeline
Day 15	Agentic AI	Build an AI agent that can research topics, summarize findings, and answer questions using web search and document analysis	• Agent architecture design • Tool integration (web search, PDF processing) • Decision-making frameworks • Human-AI interaction patterns	Case study: Smart Research Assistant Agent
Day 16	Cloud Computing & AI Deployment	Cover cloud platforms, AI model deployment, and scalable computing resources for AI applications.	Cloud platforms (AWS, Azure, GCP), containerization, model serving, API deployment, scaling strategies.	Automated ML Pipeline for House Price Prediction
Day 17	Data Engineering & Pipelines	Focus on building robust data pipelines, data processing workflows, and integration with various data sources.	ETL processes, data pipelines, batch vs. streaming processing, data quality, API integration.	Social Media Analytics with MongoDB
Day 18	Streamlit	Build interactive user interfaces using frameworks like Streamlit	Streamlit dashboards, real-time dashboards with AI insights.	Real-time Recommendation Engine
Day 19	Web APIs	Learn to develop web APIs for serving AI models	REST API principles, JSON handling,	Smart Home Energy Management System
Day 20	MLOps Fundamentals	• ML Lifecycle Management • CI/CD for ML • Model Versioning & Registry	• Automated ML pipelines from data ingestion to deployment • Version control for datasets, models, and experiments • Continuous monitoring and model drift detection	• Netflix's recommendation system deployment pipeline • Uber's Michelangelo ML platform • Airbnb's ML infrastructure for dynamic pricing
Day 21	NoSQL Database Systems	• Document Stores (MongoDB) • Key-Value Stores (Redis, DynamoDB) • Graph Databases (Neo4j, Amazon Neptune)	• Schema flexibility and horizontal scaling capabilities • CAP theorem trade-offs and eventual consistency models • Query optimization and indexing strategies for unstructured data	• Netflix's content metadata management with Cassandra • LinkedIn's social graph implementation using graph databases • Amazon's product catalog using DynamoDB
Day 22	MLOps-NoSQL Integration	• Feature Stores with NoSQL • Real-time ML Inference • Data Lakes and ML Pipelines	• NoSQL as backend for feature engineering and storage • Stream processing for real-time model predictions • Scalable data architecture supporting ML experimentation	• Spotify's music recommendation using MongoDB for feature storage • Twitter's real-time trend analysis with Redis and ML models • Tesla's autonomous driving data pipeline with distributed NoSQL systems
Day 23	IoT Technology & Edge AI	Cover the IoT hardware, embedded programming, and the deployment of AI models on edge devices, integrating with cloud platforms.	Microcontrollers (ESP32, Arduino), sensors, actuators, embedded programming, edge vs. cloud AI, TinyML, model optimization for edge.	IoT
Days 24-38: Domain-Specific AI Projects (Cloud Deployment)				
Day 24-25	IoT-based Smart Agriculture Analytics using Python, Raspberry Pi & Streamlit	Develop a smart farming system that collects real-time sensor data (soil moisture, temperature, humidity) and uses AI for irrigation optimization and crop health prediction.	Sensor integration, IoT data streaming, predictive analytics, real-time dashboards.	IoT, ML , Data Engineering & Pipelines
Day 26-27	Full Stack Django Online Bookstore with Azure Deployment using Django	Full-stack web application for browsing, purchasing, and managing an online bookstore with sales analytics, Azure	Python, Django, HTML/CSS, Bootstrap, SQLite, Chart.js, Azure	User authentication, book catalog management, order tracking, admin dashboard, sales reports
Day 28-29	Deep Learning for Medical Image Diagnosis using TensorFlow, Keras, & Azure Deployment	Build a deep learning model that classifies medical images (X-rays, MRIs) for disease detection with explainable AI insights.	CNN architectures, image preprocessing, model explainability (Grad-CAM), AI dashboards, Azure	Deep Learning, Computer Vision
Day 30-31	Residential Energy Analytics Platform using Python, Scikit-learn, Streamlit & Azure	Design and implement an AI-powered energy management platform that continuously monitors household energy consumption patterns, forecasts daily and weekly usage, detects inefficiencies, and provides real-time, actionable recommendations to reduce wastage and optimize energy consumption.	Energy data analysis, consumption forecasting, optimization algorithms, user interface design, data processing, Azure	Machine Learning , Natural Language Processing (NLP) & LLMs, Data Engineering & Pipelines
Day 32-33	Smart Waste Management System using OpenCV, TensorFlow, Streamlit & FastAPI	Develop an AI-based waste management system that uses image classification to automatically identify and categorize different types of waste (plastic, organic, recyclable, hazardous) from collected images, and recommends optimized waste collection routes and schedules based on volume and type.	Image classification for waste types, optimization algorithms, data integration, analytics dashboard.	Programming & Web Foundations, Machine Learning , AI Agents & Agentic AI with LLM

Day 34-35	EdTech Adaptive Learning Platform using FastAPI, Hugging Face Transformers, Streamlit & React	Build an AI-driven educational platform capable of analyzing learner activity, performance data, and preferences to dynamically personalize content delivery, recommend learning pathways, and provide AI-generated feedback and adaptive assessments for enhanced learner engagement.	Recommendation systems, NLP for feedback analysis, LLM integration for personalized learning, adaptive learning algorithms, user interface development.	Natural Language Processing (NLP) & LLMs, AI Agents & Agentic AI with LLM, Web APIs & Full-Stack AI Applications
Day 36	Supply Chain Analytics System using Prophet, FastAPI, React & MongoDB	Develop an AI-based supply chain optimization system that leverages historical sales data, market trends, and inventory levels to forecast demand, suggest stock replenishment strategies, and optimize inventory distribution to minimize operational costs and stockouts.	Demand forecasting models, inventory optimization algorithms, market analysis through NLP, supply chain analytics dashboard.	Machine Learning , Natural Language Processing (NLP) & LLMs, Data Science Essentials
Day 37	Digital Health Intelligence Platform using TensorFlow, FastAPI, OpenAI API, Streamlit & MySQL	Create a secure, AI-powered health analytics platform that collects patient data, analyzes health patterns, predicts potential disease risks, and provides personalized recommendations for preventive care and lifestyle adjustments based on patient history and AI insights.	Health data analytics, disease prediction models, personalized recommendation systems, secure data handling, LLM for health insights.	Machine Learning , Natural Language Processing (NLP) & LLMs, MLOps, Databases & Security
Day 38	Urban Mobility Analytics Solution using Prophet, React & FastAPI	Develop an AI-based urban mobility analytics solution that analyzes real-time traffic data, predicts congestion hotspots, and recommends optimal travel routes and timings to improve city-wide traffic flow and reduce commute times during peak hours.	Traffic pattern analysis, congestion prediction models, route optimization algorithms, urban mobility dashboard.	Machine Learning , Data Science Essentials, Web APIs & Full-Stack AI Applications