ByteXL-MRECW AIstack-GenAI -AgentiAI-IoT Innovation Readiness Training (38 Days)

Days 1-12: Foundation and Core Learning

Day	Topic	Description	Key Points	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, JavaScript	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	Python frameworks Django and Restfu API	ReactJS: JSX, Components and backend frameworks (Django, FastAPI, NodeJS). -	What is ReactJS and why use it? - JSX syntax and React Components - Backend frameworks: Django (Python), FastAPI (Python), NodeJS (JavaScript) - Use cases and differences	React, Node.Js, Restful API
Day 4	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).	Data Science Essentials
Day 5-6	Machine Learning	core concepts of traditional machine learning, including supervised learning algorithms, Unsupervised learning , model training, and evaluation metrics.	Supervised learning, classification, regression, model evaluation (accuracy, precision, recall, F1-score, R-squared, MSE), cross-validation, feature scaling.	Machine Learning
Day 7	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.	Deep Learning & Neural Networks
Day 8	Natural Language Processing (NLP) & LLMs	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.	Natural Language Processing (NLP) & LLMs
Day 9	Generative AI & Multimodal AI	the concepts of generative models for creating new content and how AI systems integrate information from multiple modalities.	GANs, VAEs, Diffusion Models (conceptual), prompt engineering, synthetic data, data fusion, cross-modal learning, image captioning, video understanding.	Generative AI & Multimodal AI

Day 10	AI Agents & Agentic AI with LLM	Understand the principles of AI agents, their design, and how Large Language Models can power autonomous agents capable of planning and executing tasks.	Agent architectures, perception-action loop, task-oriented agents, multi-agent systems, autonomous agents, ReAct pattern, LLM planning, agent loops.	AI Agents & Agentic AI with LLM
Day 11	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.	Cloud Computing & AI Deployment
Day 12	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.	Data Engineering & Pipelines
Day 13	Web APIs & Full-Stack AI Applications	Learn to develop web APIs for serving AI models and build interactive user interfaces using frameworks like Flask, Streamlit, and React for full-stack AI applications.	REST API principles, JSON handling, Flask routing, Streamlit dashboards, React components, full-stack integration, real-time dashboards with AI insights.	Web APIs & Full-Stack AI Applications
Day 14	MLOps, Databases & Security	Conclude with essential practices for managing the lifecycle of AI/ML models, storing data, and securing AI systems, along with final steps of project development and deployment.	SQL/NoSQL databases (MongoDB), MLOps (MLflow, DVC, CI/CD for ML), AI system security, authentication, project testing, cloud deployment, documentation.	MLOps, Databases & Security
Day 15	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 16-38: Domain-Specific AI Projects (Cloud Deployment)				
Day 16-17	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 18-19	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 20-21	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 22-23	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 24-25	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 26-27	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 28-29	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 30-31	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 32-33	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
Day 34-35	Environmental Data Analytics System using Scikit-learn, Streamlit, Plotly	Build an AI-powered environmental monitoring system that collects air, water, and soil data from multiple sensors, predicts pollution trends, and generates actionable alerts and reports for authorities to implement timely preventive or corrective actions.	Environmental data analysis, pollution prediction models, data integration and processing, environmental monitoring dashboards.	Machine Learning , Data Science Essentials, Data Engineering & Pipelines
Day 36	Retail Analytics Platform using FastAPI, Hugging Face Transformers, Streamlit	Develop an AI-driven system for retail analytics to analyze customer behavior, optimize business operations, and personalize customer experiences through data insights.	Customer behavior analytics, personalized recommendation systems, retail analytics, inventory optimization through data analysis.	Machine Learning , Natural Language Processing (NLP) & LLMs, Data Science Essentials
Day 37-38	Emergency Response Analytics using FastAPI, Hugging Face, Streamlit	Develop an AI-driven system to enhance disaster preparedness through predictive analytics, real-time data analysis, and intelligent resource coordination.	Disaster prediction models, real-time data analysis, resource optimization algorithms, emergency response analytics, crisis management dashboards.	Machine Learning , AI Agents & Agentic AI with LLM, Data Engineering & Pipelines

ByteXL-MRECW AIstack-GenAI Training Analytics

Innovation Readiness Training Program (38 Days) - Comprehensive Analysis

25+	35+	40+	12	8
Core Technologies	Tools & Frameworks	Modules & Packages	Major Projects	Domain Areas

Core Technologies

Python Programming	Java Programming
JavaScript (ES6+)	HTML5 & CSS3
React.js	Node.js
Django Framework	FastAPI
Machine Learning	Deep Learning
Natural Language Processing	Computer Vision
Generative AI	Large Language Models
IoT Technology	Edge AI
Cloud Computing	MLOps
Data Engineering	REST APIs
Git Version Control	SQL & NoSQL Databases
Containerization	Microcontrollers
Web Security	

Tools & Frameworks

TensorFlow & Keras	Scikit-learn
OpenCV	Hugging Face Transformers
Streamlit	Flask
Express.js	Bootstrap
Chart.js	Plotly
Pandas	NumPy
Matplotlib	Seaborn
Prophet	MongoDB
MySQL	SQLite
Azure Cloud	AWS
GCP	Docker
MLflow	DVC
Raspberry Pi	ESP32
Arduino	OpenAI API
React Router	Git
JSON	RESTful APIs
CI/CD	TinyML
Grad-CAM	

Major Projects

IoT Smart Agriculture Analytics
Full Stack Django Online Bookstore
Deep Learning Medical Image Diagnosis
Residential Energy Analytics Platform
Smart Waste Management System
EdTech Adaptive Learning Platform
Supply Chain Analytics System
Digital Health Intelligence Platform
Urban Mobility Analytics Solution
Environmental Data Analytics System
Retail Analytics Platform
Emergency Response Analytics

Domain Areas

Agriculture & IoT	E-commerce & Retail
Healthcare & Medical AI	Energy & Sustainability
Education Technology	Supply Chain & Logistics
Urban Planning & Smart Cities	Environmental Monitoring
Emergency Response & Safety	Waste Management