AI and ML Course Catalog – 90 Days

Day	Module	Topics Covered
1-2	**Introduction to AI and ML**	Overview of AI and ML, Types of Machine Learning, Applications of AI, Installing Python & Libraries
3-5	**Python for AI and ML**	Basic Python for Data Science, Numpy, Pandas, Matplotlib, Data Structures, Functions
6-8	**Mathematics for Machine Learning**	Linear Algebra, Calculus, Probability, and Statistics for ML
9-11	**Data Preprocessing**	Data Cleaning, Handling Missing Values, Data Transformation, Normalization, Feature Engineering
12-14	**Supervised Learning Basics**	Introduction to Supervised Learning, Regression, Classification, Types of Supervised Models
15-17	**Linear Regression**	Simple Linear Regression, Multiple Linear Regression, Cost Function, Gradient Descent
18-20	**Logistic Regression**	Binary Classification, Logistic Function, Cost Function, Model Evaluation Metrics
21-23	**Decision Trees & Random Forests**	Building Decision Trees, Overfitting, Random Forest Algorithm, Hyperparameter Tuning
24-26	**Support Vector Machines (SVM)**	Introduction to SVM, Linear and Non-Linear SVM, Kernel Trick, Hyperplane Optimization
27-29	**K-Nearest Neighbors (KNN)**	KNN Algorithm, Distance Metrics, Model Evaluation, KNN for Classification
30-32	**Naive Bayes Classifier**	Naive Bayes Algorithm, Probability Theory, Application to Text Classification
33-35	**Unsupervised Learning Basics**	Introduction to Unsupervised Learning, Clustering, Dimensionality Reduction
36-38	**K-Means Clustering**	K-Means Algorithm, Choosing K, Elbow Method, Applications of Clustering
39-41	**Hierarchical Clustering**	Agglomerative & Divisive Clustering, Dendrogram, Evaluating Clustering Results
42-44	**Principal Component Analysis (PCA)**	PCA for Dimensionality Reduction, Eigenvectors, Eigenvalues, Applications of PCA
45-47	**Reinforcement Learning Basics**	Introduction to Reinforcement Learning, Markov Decision Process, Q-Learning
48-50	**Deep Learning Overview**	Introduction to Neural Networks, Neural Network Architecture, Activation Functions
51-53	**Feedforward Neural Networks**	Forward Propagation, Backpropagation, Gradient Descent in Neural Networks
54-56	**Convolutional Neural Networks (CNNs)**	CNN Architecture, Convolution, Pooling, Applications in Image Recognition

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57-59	**Recurrent Neural Networks (RNNs)**	RNN Architecture, Long Short-Term Memory (LSTM), Applications in Time Series and NLP
60-62	**Natural Language Processing (NLP)**	Text Preprocessing, Tokenization, Bag of Words, TF-IDF, Word Embeddings (Word2Vec, GloVe)
63-65	**Sentiment Analysis & Text Classification**	Building Sentiment Analysis Models, Text Classification Techniques, Evaluating Models
66-68	**Generative Models**	Introduction to GANs (Generative Adversarial Networks), Training GANs, Applications of GANs
69-71	**Model Evaluation & Hyperparameter Tuning**	Cross-validation, Grid Search, Random Search, Bias-Variance Tradeoff
72-74	**Advanced Topics in AI**	Transfer Learning, Reinforcement Learning with Deep Q-Networks (DQN), Hyperparameter Optimization
75-77	**AI and ML in Real-World Applications**	Computer Vision Applications, Speech Recognition, Autonomous Vehicles, AI in Healthcare
78-80	**Ethics in AI**	Ethical Considerations, Bias in AI Models, AI Accountability, Fairness and Transparency
81-83	**Project Work - Part 1**	Working on Real-world AI/ML Project (e.g., Image Classification, Chatbots, Time Series Forecasting)
84-86	**Project Work - Part 2**	Model Training, Evaluation, Fine-tuning, Data Preparation, and Optimization
87-89	**Final Review and Exam Preparation**	Review of Key Concepts, Hands-on Project Completion, Mock Exam and Practice Problems
90	**Final Assessment & Certification**	Final Project Presentation, Exam, Feedback, Course Completion and Certification