Machine Learning Study Plan

Prerequisite Topics	Mathematics	Calculus	Derivatives	
			Integrals	
			Resources	Khan Academy Calculus
		Linear Algebra	Vectors and Matrices	Matrix multiplication
				Eigenvalues and Eigenvectors
			Resources	Khan Academy - Linear Algebra
				MIT OpenCourseWare - Linear Algebra
		Probability & Statistics	Probability Theory	Random variables
				Distributions
			Descriptive Statistics	Mean, Median, Mode
				Variance and Standard Deviation
			Inferential Statistics	Hypothesis Testing
				Confidence Intervals
			Resources	Khan Academy - Probability and Statistics
	Python Programming	Basic Syntax	Variables and Data Types	
			Control Structures	
		Data Structures	Lists and Dictionaries	
			Sets and Tuples	
		Libraries for Data Science	NumPy	
			Pandas	
			Matplotlib	
		Resources	Codecademy - Learn Python	
			freeCodeCamp - Python for Data Science	
	R Programming (optional)	Basic Syntax	Variables and Functions	
			Control Structures	
		Data Visualization	ggplot2	
			Base R plots	
		Resources	DataCamp - Introduction to R	
			Coursera - R Programming	
Machine Learning Fundamentals	Supervised Learning	Classification	Algorithms like logistic regression, SVM	
		Regression	Algorithms like linear regression, decision trees	
	Unsupervised Learning	Clustering	K-Means, Hierarchical clustering	
		Dimensionality Reduction	PCA, t-SNE	
	Reinforcement Learning	Markov Decision Processes		
		Q-Learning		
	Resources	Coursera - Machine Learning by Andrew Ng		
Advanced Topics	Deep Learning	Neural Networks	Structure of a neuron	
			Types of Neural Networks	
		Convolutional Neural Networks	Applications in Image Processing	
		Recurrent Neural Networks	Applications in Sequence Data	
		Resources	DeepLearning.ai - Deep Learning Specialization	
			Fast.ai - Practical Deep Learning for Coders	
	Natural Language Processing	Text Processing Techniques	Tokenization	
			Stemming and Lemmatization	
		Algorithms	Naive Bayes	
			RNNs and Transformers	
		Resources	Coursera - Natural Language Processing Specialization	
			Hugging Face Resources for NLP	
Practical Applications	Data Preprocessing	Data Cleaning	Handling missing values	
			Data normalization	
		Feature Engineering	Selecting relevant features	
			Creating new features	
	Model Deployment	Tools and Techniques	Flask for APIs	
			Docker for containerization	
		Cloud Platforms	AWS	
			Google Cloud	
		Resources	Coursera - Deploying Machine Learning Models	
			Towards Data Science - Medium articles on Deployment	
Projects & Hands-On Experience	Kaggle Competitions	Participate in challenges		
		Work on datasets		
	Open Source Contributions	Contribute to machine learning libraries		
		Engage with community projects		
	Resources	Kaggle - Platform for practice and projects		
		GitHub - Explore repositories for machine learning projects		
		Blog - Transition from Software Engineering to Machine Learning		