Month 1: Fundamentals of AI/ML & Math

Overview & Schedule (Weeks 1-4)

Week 1: Overview & Environment

Day	Topic	Theory (Brief)	Practice (Brief)	Time
Day 1	AI Landscape Overview	Watch: IBM Technology's AI Trends for 2025 (12 mins). Then skim this visual r...	Action: Create a GitHub repo named 'AI-Learning-Journey'. Create a README.md ...	2h
Day 2	Python for ML Refresher (NumPy)	Focus: NumPy is the engine of ML. Watch NumPy Crash Course (FreeCodeCamp). Fu...	Exercise: Create a random 10x10 matrix. Find the mean, stdev, and transpose i...	2h
Day 3	Python for ML Refresher (Pandas)	Focus: Data manipulation. Watch Pandas Tutorial (Keith Galli). Concepts: Data...	Exercise: Load the 'Titanic' dataset (from Seaborn or Kaggle). Fill missing a...	2h
Day 4	Visualization (Matplotlib/Seaborn)	Focus: Data Storytelling. Watch Seaborn for Beginners. Understand: Histograms...	Exercise: Plot the distribution of 'Fare' in Titanic. Create a scatter plot o...	2h

Week 2: Math: Linear Algebra

Day	Topic	Theory (Brief)	Practice (Brief)	Time
Day 1	Vectors & Spaces	Visual Intuition: Watch 3Blue1Brown's Vectors, what even are they? and Linear...	Paper & Pencil: Draw vectors [1, 2] and [2, 1]. Draw their sum. Python: Repre...	2h
Day 2	Matrices & Operations	Visual Intuition: Watch 3Blue1Brown's Matrix multiplication as composition. K...	Python: Implement matrix multiplication using specific formula (3 nested loop...	2h

Day	Topic	Theory (Brief)	Practice (Brief)	Time
Day 3	Eigenvectors & Eigenvalues	Visual Intuition: Watch 3Blue1Brown's Eigenvectors and Eigenvalues. Concept: ...	Python: Use `np.linalg.eig` on a simple 2x2 matrix. Verify that `A @ v = lamb...	2h

Week 3: Math: Calculus

Day	Topic	Theory (Brief)	Practice (Brief)	Time
Day 1	Derivatives & Rates of Change	Visual Intuition: Watch 3Blue1Brown's Essence of Calculus. Concept: Derivativ...	Manual: Calculate derivative of y = x^2 and y = 3x + 2. Relate it to 'slope'.	2h
Day 2	Chain Rule	Crucial for Deep Learning: The Chain Rule allows us to find the error attribu...	Paper: Calculate derivative of f(g(x)) where f(x) = x^2 and g(x) = sin(x).	2h
Day 3	Gradient Descent Intuition	The Heart of ML: Watch StatQuest's Gradient Descent, Step-by-Step. Concept: T...	Python: Implement simple gradient descent to find the minimum of y = (x-3)^2 ...	2h

Week 4: Math: Probability & Statistics

Day	Topic	Theory (Brief)	Practice (Brief)	Time
Day 1	Distributions (Normal, Binomial)	Key Concept: Everything in AI is probabilistic. Watch StatQuest's Normal Dist...	Python: Generate 1000 random data points from a Normal Distribution using `np...	2h
Day 2	Bayes Theorem	The Logic of Updating Beliefs: Watch 3Blue1Brown's Bayes Theorem. Formula: P(...	Problem: Solve the 'Medical Test Paradox' problem on paper. (If a test is 99%...	2h
Day 3	Module 1 Review	Review: Re-watch 3Blue1Brown's 'Essence of Linear Algebra' Ch 1-3. These are ...	Self-Check: Can you explain what a 'Dot Product' represents geometrically? (P...	2h