

4-Week Beginner Plan: Math + ML Coding

Introduction

This 4-week plan combines applied mathematics and machine learning for beginners.

It uses two beginner-friendly books:

- Mathematics for Machine Learning (MML)
- Grokking Machine Learning (GML)

Week 1

Week 1: Foundations of ML & Linear Algebra

Goal: Build strong intuition about ML and learn basic linear algebra.

Day 1: GML Ch. 12 What is ML + First ML model (linear classifier)

Day 2: MML Ch. 1 Introduction + review of vectors

Day 3: MML Ch. 2 Linear algebra (dot product, matrices)

Day 4: Practice: NumPy vector/matrix operations

Day 5: GML Ch. 34 Linear regression

Day 6: Code simple regression with scikit-learn

Day 7: Recap and review

Week 2

Week 2: Math for Understanding Models

Goal: Understand how ML models learn using calculus & probability.

Day 1: GML Ch. 56 KNN and Decision Trees

Day 2: MML Ch. 4 Derivatives (Calculus basics)

Day 3: MML Ch. 4.4 Gradient Descent

Day 4: Code: Basic gradient descent in Python

Day 5: GML Ch. 78 Naive Bayes & Probabilities

Day 6: MML Ch. 3 Probability & distributions

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Day 7: Mini project: test 2 models on MNIST using sklearn

Week 3

Week 3: Practical ML with Math Connection

Goal: Dig deeper into ML models & apply optimization logic.

Day 1: GML Ch. 910 Build a spam filter + evaluate models

Day 2: MML Ch. 5 Optimization (loss, cost functions)

Day 3: Code: Implement loss functions (MSE, Cross-Entropy)

Day 4: GML Ch. 11 Combining models (ensembles)

Day 5: Practice: Train/test split, confusion matrix

Day 6: Review: Revisit math from MML Ch. 35

Day 7: Summary how math supports ML models

Week 4

Week 4: Neural Networks & Final Practice

Goal: Basics of neural networks + solidify learning.

Day 1: GML Ch. 1213 Intro to neural networks

Day 2: Watch a visual video on backpropagation

Day 3: Practice: Tiny neural net with Keras or PyTorch

Day 4: MML Ch. 6 (optional): SVD/PCA

Day 5: Final practice: Train 2 models on MNIST (linear & NN)

Day 6: Review key formulas and concepts

Day 7: Wrap-up and reflect

Tools You'll Need

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- Python 3 + Jupyter or Google Colab

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- numpy, pandas, matplotlib, scikit-learn
- (Optional for Neural Networks) tensorflow or pytorch