

3-Month AI/ML Learning Roadmap

Month 1: Mathematical Foundations & Python Programming

Week 1: Python Basics & Environment Setup

- **Monday-Tuesday:** Python fundamentals
 - Resource: [Python.org Official Tutorial](#)
 - Topics: Variables, data types, control flow
- **Wednesday-Thursday:** Python advanced concepts
 - Resource: [Real Python](#)
 - Topics: Functions, classes, modules
- **Friday-Weekend:** Practice projects
 - Resource: [HackerRank Python](#)
 - Build: Simple calculator, to-do list app

Week 2: Mathematics for AI/ML

- **Monday-Tuesday:** Linear Algebra
 - Resource: [Khan Academy Linear Algebra](#)
 - Topics: Vectors, matrices, eigenvalues
- **Wednesday-Thursday:** Calculus
 - Resource: [Paul's Online Math Notes](#)
 - Topics: Derivatives, partial derivatives, chain rule
- **Friday-Weekend:** Statistics & Probability
 - Resource: [StatQuest YouTube Channel](#)
 - Topics: Mean, variance, distributions, Bayes theorem

Week 3: Data Science Libraries

- **Monday-Tuesday:** NumPy
 - Resource: [NumPy Official Tutorial](#)
 - Practice: Array operations, broadcasting
- **Wednesday-Thursday:** Pandas
 - Resource: [Pandas Documentation](#)
 - Practice: Data manipulation, cleaning
- **Friday-Weekend:** Matplotlib & Seaborn
 - Resource: [Matplotlib Tutorials](#)

- Project: Data visualization dashboard

Week 4: Introduction to ML

- **Monday-Tuesday:** ML Fundamentals
 - Resource: [Google's Machine Learning Crash Course](#)
 - Topics: Supervised vs unsupervised learning
 - **Wednesday-Thursday:** Scikit-learn basics
 - Resource: [Scikit-learn Tutorials](#)
 - Practice: Simple classification problems
 - **Friday-Weekend:** First ML Project
 - Resource: [Kaggle Learn](#)
 - Build: Iris dataset classification
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Month 2: Core Machine Learning Algorithms

Week 5: Supervised Learning - Regression

- **Monday-Tuesday:** Linear Regression
 - Resource: [Andrew Ng's Course \(Coursera\)](#)
 - Implementation: From scratch & with scikit-learn
- **Wednesday-Thursday:** Polynomial & Ridge Regression
 - Resource: [Towards Data Science](#)
 - Practice: Boston housing price prediction
- **Friday-Weekend:** Logistic Regression
 - Resource: [StatQuest Logistic Regression](#)
 - Project: Credit card fraud detection

Week 6: Supervised Learning - Classification

- **Monday-Tuesday:** Decision Trees
 - Resource: [Visual Introduction to ML](#)
 - Practice: Customer churn prediction
- **Wednesday-Thursday:** Random Forests & Ensemble Methods
 - Resource: [DataCamp Tutorial](#)
 - Implementation: Ensemble voting classifier
- **Friday-Weekend:** Support Vector Machines
 - Resource: [SVM Explained](#)
 - Project: Image classification

Week 7: Unsupervised Learning

- **Monday-Tuesday:** K-Means Clustering

- Resource: [K-Means Clustering Visualization](#)
 - Practice: Customer segmentation
- **Wednesday-Thursday:** Hierarchical Clustering & DBSCAN
 - Resource: [Scikit-learn Clustering Guide](#)
 - Implementation: Document clustering
- **Friday-Weekend:** Principal Component Analysis (PCA)
 - Resource: [PCA Visualization](#)
 - Project: Dimensionality reduction visualization

Week 8: Model Evaluation & Improvement

- **Monday-Tuesday:** Cross-validation & Metrics
 - Resource: [Machine Learning Mastery - Metrics](#)
 - Topics: Accuracy, precision, recall, F1-score
 - **Wednesday-Thursday:** Feature Engineering
 - Resource: [Python Data Science Handbook](#)
 - Practice: Creating polynomial features
 - **Friday-Weekend:** Hyperparameter Tuning
 - Resource: [Kaggle Feature Engineering Course](#)
 - Project: End-to-end ML pipeline
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Month 3: Deep Learning & Advanced Topics

Week 9: Neural Networks Fundamentals

- **Monday-Tuesday:** Perceptron & Activation Functions
 - Resource: [Neural Networks and Deep Learning](#)
 - Implementation: Build perceptron from scratch
- **Wednesday-Thursday:** Backpropagation
 - Resource: [3Blue1Brown Neural Network Series](#)
 - Practice: Gradient descent visualization
- **Friday-Weekend:** Introduction to TensorFlow/Keras
 - Resource: [TensorFlow Tutorials](#)
 - Project: MNIST digit classifier

Week 10: Convolutional Neural Networks (CNN)

- **Monday-Tuesday:** CNN Architecture
 - Resource: [Stanford CS231n](#)
 - Topics: Convolution, pooling, filters
- **Wednesday-Thursday:** Popular CNN Architectures
 - Resource: [Papers with Code](#)
 - Study: LeNet, AlexNet, VGG

- **Friday-Weekend:** CNN Project
 - Resource: [Keras CNN Examples](#)
 - Build: Image classification app

Week 11: Recurrent Neural Networks (RNN)

- **Monday-Tuesday:** RNN & LSTM Basics
 - Resource: [Understanding LSTM Networks](#)
 - Topics: Sequence modeling, vanishing gradients
- **Wednesday-Thursday:** Text Processing & NLP
 - Resource: [NLTK Book](#)
 - Practice: Tokenization, word embeddings
- **Friday-Weekend:** RNN Project
 - Resource: [TensorFlow Text Generation](#)
 - Build: Sentiment analysis model

Week 12: Advanced Topics & Capstone Project

- **Monday-Tuesday:** Transfer Learning
 - Resource: [TensorFlow Transfer Learning](#)
 - Practice: Fine-tune pre-trained models
- **Wednesday-Thursday:** GANs & Autoencoders
 - Resource: [GAN Lab Interactive](#)
 - Experiment: Generate synthetic data
- **Friday-Weekend:** Capstone Project
 - Resource: [Kaggle Competitions](#)
 - Build: Complete end-to-end ML project

Additional Resources & Tips

Free Learning Platforms:

- [Coursera](#): Audit courses for free
- [Fast.ai](#): Practical deep learning course
- [MIT OpenCourseWare](#): Free MIT courses
- **YouTube Channels:**
 - [Sentdex](#)
 - [Two Minute Papers](#)
- [Google Colab](#): Free GPU for training

Tips for Success:



1. **Code Daily:** Even 30 minutes makes a difference!
2. **Join Communities:**

- [Reddit r/MachineLearning](#)
 - [Discord ML Community](#)
3. **Document Progress:** Keep a learning journal
 4. **Build Projects:** Theory + Practice = Mastery
 5. **Stay Curious:** AI/ML is evolving rapidly!

Milestone Projects:

- **Month 1:** Data analysis dashboard
- **Month 2:** ML web app deployment
- **Month 3:** Custom deep learning model

Progress Tracking Template

Week	Topics Covered	Projects Completed	Next Steps
1	 Python Basics	 Calculator App	Review OOP
2	Linear Algebra	Math problems	Khan Academy
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Quick Reference Links

Datasets:

- [Kaggle Datasets](#)
- [UCI Machine Learning Repository](#)
- [Google Dataset Search](#)

Documentation:

- [Scikit-learn Documentation](#)
- [TensorFlow Documentation](#)
- [PyTorch Documentation](#)

Tools:

- [Google Colab](#)
 - [Jupyter Notebooks](#)
 - [VS Code](#)
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Congratulations!

By completing this roadmap, you'll have a solid foundation in AI/ML! Remember, learning is a journey, not a destination. Keep exploring and building!