







# 3-Month AI/ML Learning Roadmap

by SYNTAX ERROR 







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## Month 1: Mathematical Foundations & Python Programming






### Week 1: Python Basics & Environment Setup

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

### Week 2: Mathematics for AI/ML

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

### Week 3: Data Science Libraries

- **Monday-Tuesday:** NumPy
  -  Resource: [NumPy Official Tutorial](https://numpy.org)
  -  Practice: Array operations, broadcasting
- **Wednesday-Thursday:** Pandas
  -  Resource: [Pandas Documentation](https://pandas.pydata.org)
  -  Practice: Data manipulation, cleaning
- **Friday-Weekend:** Matplotlib & Seaborn
  -  Resource: [Matplotlib Tutorials](https://matplotlib.org)

- 🎯 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

# 📅 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

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## 📅 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!

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