Machine Learning Roadmap for Beginners (2-Month Plan)

Week 1: Python & Data Handling (Days 1–7)

Goal: Python mastery + data manipulation

Day	Task
1	Revise Python basics: variables, loops, conditionals
2	Functions, modules, and file handling
3	Python lists, dictionaries, comprehensions
4	NumPy: arrays, operations, basic calculations
5	Pandas: Series, DataFrame, indexing, selection
6	Pandas: reading CSV, filtering, groupby, aggregation
7	Matplotlib & Seaborn: bar chart, line chart, histogram

Mini Project: Analyze a CSV file of students' marks (sum, average, highest, plot charts)

Week 2: Statistics & Math Basics (Days 8–14)

Goal: Understand the math behind ML

Day	Task
8	Mean, median, mode, variance, standard deviation
9	Probability basics & simple distributions
10	Correlation & covariance
11	Linear algebra: vectors, dot product
12	Matrices: addition, multiplication, transpose
13	Apply stats to student marks dataset
14	Practice mini-project: analyze dataset and visualize stats

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Week 3–4: Supervised Learning (Days 15–28)

Goal: Learn regression and classification

Day	Task
15	ML intro: supervised vs unsupervised, train-test split
16	Linear Regression: theory & Python implementation
17	Linear Regression project: predict student total marks
18	Logistic Regression: theory & Python implementation
19	Logistic Regression project: classify pass/fail
20	Decision Trees: theory & Python implementation
21	Decision Tree project: classify fruits by features
22	Random Forest: theory & implementation
23	Project: student grade classification using Random Forest
24	Evaluate models: accuracy, precision, recall, F1-score
25	Confusion Matrix practice
26	Cross-validation & hyperparameter tuning
27	Mini project: improve previous models with tuning
28	Recap & revision: all supervised learning algorithms

Week 5: Unsupervised Learning (Days 29–35)

Goal: Clustering & pattern recognition

Day	Task
29	K-Means clustering: theory & Python
30	K-Means project: cluster students by marks
31	Hierarchical clustering: theory & Python
32	PCA: theory & dimensionality reduction
33	Mini project: cluster movies dataset or student groups
34	Visualizing clusters using Matplotlib/Seaborn

Day	Task
35	Recap & practice clustering with multiple datasets

Week 6: Advanced ML & Model Evaluation (Days 36–42)

Goal: Improve models & learn ensemble methods

Day	Task
36	Ensemble methods: Random Forest & Gradient Boosting
37	Project: predict student performance using ensemble models
38	Overfitting & Underfitting: theory & practice
39	Model evaluation metrics deep dive
40	Mini project: Titanic dataset (Kaggle)
41	Hyperparameter tuning for ensemble models
42	Recap: all advanced ML techniques

Week 7–8: Real Projects & Deployment (Days 43–60)

Goal: Build 2–3 full ML projects

Day	Task
43–45	Project 1: Student performance predictor (regression + classification)
46–48	Project 2: Fruit/Movie classifier (classification + evaluation)
49–51	Project 3: Student clustering & visualization
52–54	Project 4: Optional Kaggle dataset of your choice
55–57	Clean code, create functions, modularize projects
58	Document projects (Markdown/Readme)
59	Optional: Deploy a simple ML model using `pickle` or `streamlit`
60	Recap & portfolio preparation: all projects in one folder

Mentor Tips:

1. Code every day (30–60 mins minimum).
2. Build mini-projects along the way.
3. Debug & experiment actively.
4. Use Kaggle datasets for practice after Week 4.
5. Track progress daily.

Outcome after 2 months: - Strong understanding of ML concepts. - Ability to build real ML projects in Python. - Portfolio ready for internships or jobs.