Session 1 Handout: AI and ML Fundamentals (Domain 1, 20%)

FAST-12 AI Practitioner Certification Prep · 7formations · Instructor: Wadood Chaudhary · All examples fictional · Exam guide v1.2

Why this session matters

Domain 1 is a fifth of the scored exam. Many questions ask which approach fits a problem and how to read model results. If you can classify a problem and read a confusion matrix, you will get most of this domain right.

Key concepts

1. AI, ML, deep learning, generative AI

AI is the broad field. ML learns patterns from data. Deep learning uses neural networks with many layers. Generative AI is deep learning that creates new content. **Not every problem needs ML:** a fixed, explainable rule (send a reminder 48 hours before) is cheaper and more reliable.

2. Learning types

Type	Data	Example (fictional)
Supervised	Labeled	Fraud yes/no from past claims (classification); price (regression)
Unsupervised	Unlabeled	Group machines by vibration pattern (clustering)
Reinforcement	Rewards from actions	Robot learns a path by trial and reward

3. ML lifecycle

Business goal → data collection and preparation → feature engineering → training → evaluation → deployment → monitoring (drift) → retraining. **Inference** is using the trained model: real-time (low latency), batch (large volumes, no rush), or asynchronous.

4. Metrics

Metric	Question it answers
Accuracy	What share of all predictions were right? Misleading on imbalanced data
Precision	Of items flagged positive, how many were?
Recall	Of real positives, how many did we catch?
F1	Balance of precision and recall
AUC	Ranking quality across thresholds
MAE / RMSE	Error size for regression

Overfitting: great on training data, poor on new data. **Underfitting:** poor on both.

Worked example (fictional)

Pioneer Valley Mutual's fraud model on 1,000 test claims: TP 30, FN 20, FP 10, TN 940. Accuracy 97%, precision 75%, recall 60%, F1 ≈ 0.67. Missed fraud is costly, so recall matters most.

Checklist

- ☐ I can say whether a problem needs ML at all.
- ☐ I can name the learning type from the data described.
- ☐ I can compute precision and recall from a matrix.
- ☐ I can tell overfitting from underfitting.
- ☐ W1 study plan written; exam guide task statements marked.