

10-Day Pre-Course Bootcamp

CivicOS 10-Day Technical Prep Track · Hands-on Deep Learning

CivicOS Technical Learning Track

General Technical Comfort → Deep Learning-Ready in 10 Days

Goal

Get a CivicOS learner from *general technical comfort* to **ready to absorb advanced deep learning lecture notes and implement examples** in 10 days.

Outcomes by Day 10

- Can read and modify Python ML/DL scripts confidently
- Understands train/val/test, overfitting, metrics, and error analysis
- Can build and train a basic Keras model end-to-end
- Understands embeddings, transformers, and LLM finetuning at a practical level
- Can map AI implementation choices to governance and accountability tradeoffs

Daily Schedule · 90–120 min / day

Complete each day's deliverable before advancing. Days 5 and 10 include checkpoint reviews.

DAY

1

Python Refresh for ML

Focus: Syntax, data structures, functions, files — lists/dicts, loops, comprehensions, imports, reading CSV/JSON

Deliverable: `python_basics_exercises.py`

Success check: Parse a CSV and produce summary stats

DAY

2

NumPy + Pandas Fundamentals

Focus: Arrays, DataFrames, filtering, joins, groupby

Deliverable: Notebook with data cleaning + feature columns

Success check: Transform raw table into model-ready matrix

DAY

3

Intro Statistics + Evaluation Intuition**Focus:** Mean/variance, distributions, correlation, leakage, bias in datasets**Deliverable:** 1-page note on metric selection pitfalls**Success check:** Choose correct metric for 3 use-cases: classification / regression / imbalanced

DAY

4

Classical ML Baselines**Focus:** Logistic regression / tree baseline; train/val/test split**Deliverable:** Baseline model report (accuracy, precision/recall/F1)**Success check:** Explain overfitting signs and one mitigation

DAY

5

Neural Nets Essentials**Focus:** Perceptron, hidden layers, activations, loss, gradient descent, backprop intuition**Deliverable:** Simple MLP in Keras on tabular data**Success check:** Explain what backprop does in plain English

DAY

6

Keras/TensorFlow Workflow**Focus:** Model build / compile / fit / evaluate; callbacks; early stopping**Deliverable:** Reusable Keras training template**Success check:** Run two experiments with different hyperparameters and compare

DAY

7

Computer Vision Basics**Focus:** CNN intuition, kernels/filters, transfer learning**Deliverable:** Transfer-learning mini-classifier**Success check:** Document why transfer learning beat training from scratch — or didn't

DAY

8

NLP Foundations**Focus:** Tokenization, bag-of-words, TF-IDF, embeddings**Deliverable:** Text classification baseline + embedding version**Success check:** Compare BoW vs embedding tradeoffs

DAY

9

Transformers + LLM Practical Concepts

Focus: Attention intuition, transformer blocks, prompting, finetuning vs RAG

Deliverable: One-page architecture explainer for non-technical stakeholders

Success check: Choose between prompt-only, RAG, and finetuning for 3 scenarios

DAY

10

CivicOS Integration Day

Focus: Applying course concepts to government/public-interest contexts

Deliverable: CivicOS AI Readiness Memo (2 pages) — model choice, governance controls, evaluation plan, risk & accountability checkpoints

Success check: Present recommendation with explicit auditability + human-oversight criteria

Required Tooling

- Python 3.10+

- scikit-learn, tensorflow (or torch)

- JupyterLab or VS Code notebooks

- Optional: GPU / Google Colab

- numpy, pandas, matplotlib

Weekly Checkpoints

CHECKPOINT A · After Day 5

Can train a basic neural network and interpret learning curves.

CHECKPOINT B · After Day 10

Can follow advanced deep learning lecture content without getting lost in prerequisites. Can convert technical concepts into CivicOS policy and governance implications.

CivicOS Lens · Non-Negotiable Questions

Every mini-project must answer all four questions before it is considered complete.

- 1 What public decision could this model affect?
- 2 How do we audit outcomes?

- 3 Where is human override mandatory?
- 4 What failure mode harms public trust most?

Stretch Track - Optional 5 Extra Days

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| Days 11–13 | Model monitoring + drift detection |
| Day 13 | Fairness testing and subgroup analysis |
| Day 14 | Inference latency / cost benchmarking |
| Day 15 | Production playbook draft — model card + risk register |