Merged Study + Lecture Development Plan (19 Weeks)

Learning roadmap with parallel lecture/tutor prep milestones

Week(s)	Learning Focus	Layer 1: Raw Notes	Layer 2: Lecture/Tutorial Prep	Tags
Week(s)	Learning Focus	Note-Taking Goal (Layer 1 - Raw)	Lecture/Tutorial Prep Goal (Layer 2 - Public)	Tags
1	Ch.1 (ML overview) + Ch.12 partial (install)	Org-mode quick notes after each session; record environment setup; keep a `env.yml`.	None yet; mark candidates for intro slides (what is ML, supervised/unsupervised).	:lecture:
2	Ch.2 (Perceptron/Adaline)	Bullet notes on update rules; plot loss; keep small NumPy implementation.	Flag 1-2 visuals for Perceptron intuition; reserve for Phase 1 slides.	:lecture:
3	Ch.3 (Classifier tour)	Summary of each model + when to use; small benchmark script.	Collect confusion-matrix examples for later slide; no slides yet.	:lecture:
4	Ch.4 (Preprocessing)	Pipelines, imputation, encoding; store reusable Pipeline template.	Start drafting 'Data Prep' diagrams (fit/transform flow) for students & SMEs.	:lecture: :SME:
5	Ch.5 (Dimensionality Reduction)	PCA vs LDA takeaways; plots of explained variance; t-SNE caveats.	Draft Phase 1 outline: Intro + Data Prep + DR; collect clean plots.	:lecture:
6	Ch.6 (Eval & Tuning)	Learning/validation curves; CV templates; metrics beyond accuracy.	Prepare metric visuals; SMEs: 'choosing a model responsibly'.	:lecture: :SME:
7	Ch.7 (Ensembles)	Pros/cons RF vs GBM; feature importance notes.	Add ensemble section to Phase 1 slides.	:lecture:
8	Ch.8 (Sentiment/NLP intro)	Text pipeline bullets; TF-IDF; out-of-core pattern.	SME tutorial idea: customer feedback triage; keep as Phase 1 annex.	:SME:
9	Ch.9 (Regression)	Residual plots; robust regression notes; feature engineering examples.	Student exercise slides: build baseline -> diagnose -> improve.	:lecture:
10	Ch.10 (Clustering)	Elbow/silhouette criteria; DBSCAN intuition.	Finalize Phase 1 slides: 4-5 student lectures + 1-2 SME tutorials.	:lecture: :SME:
11	Ch.11 (MLP from scratch)	Derive backprop once; keep clean MNIST from-scratch code.	No slides yet; focus on correctness & clean diagrams.	:lecture:
12	Ch.12 (PyTorch basics)	Capture minimal training loop; Dataset/DataLoader pattern.	Prepare live-demo notebook for later; no slides yet.	:demo:
13	Ch.13 (Autograd, Modules)	Custom nn.Module examples; autograd mental model.	Start Phase 2 outline (DL intro).	:lecture:
14	Ch.14 (CNNs)	Architecture notes; overfitting controls & augmentation.	Draft Phase 2 slides: CNN basics + small image demo.	:lecture: :demo:
15	Ch.15 (RNN/LSTM)	Sequence pitfalls; gradient clipping; baseline vs LSTM.	Add sequence modeling section; choose SME example (log parsing, forecasting).	:lecture: :SME:
16	Ch.16 (Transformers)	Attention math summary; fine-tuning checklist (seeds, logging).	Slides for attention intuition; plan BERT fine-tune demo (not live).	:lecture:
17	Ch.17 (GANs)	Mode collapse symptoms; training tips; DCGAN template.	Keep demo as video/gifs; slides focus on intuition.	:lecture: :demo:
18	Ch.18 (GNNs)	Message passing shapes; small graphs first; PyTorch Geometric notes.	Slides: graph representations & simple task (molecules or networks).	:lecture:
19	Ch.19 (RL)	Tabular Q-learning first; then DQN; Gym basics.	Finalize Phase 2 slides: DL, CNN, RNN/Transformer, GNN, RL. Prepare 2-3 SME tutorials.	:lecture: :SME: