# DATA 301: Introduction to Machine Learning - Fall 2026

| DATE | WEEK | DAY | Lecture Topic | Reading (Geron) | Homework / Exams Due | Notes |
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| **09/01/2026** | 1 | **Tuesday** | **Day 1: Course Setup, Git Workflow & the ML Landscape** | *ch. 1 (all)* | **Set up Python, JupyterLab, Git, and your course repo** | **Bring your laptop. Unit 1: Evaluation Done Right.** |
| **09/03/2026** | 1 | **Thursday** | **Day 2: Regression as a Lab Bench - Learning Curves, Under- & Overfitting** | *ch. 4: Polynomial Regression; Learning Curves* | **HW 1 due Sunday 9/6 11:59pm** | |
| **09/08/2026** | 2 | **Tuesday** | **Day 3: Bias-Variance and Regularization (Ridge, Lasso, Elastic Net)** | *ch. 4: Regularized Linear Models* | | |
| **09/10/2026** | 2 | **Thursday** | **Day 4: Cross-Validation for Real - Leakage, Stratification, Nested CV** | *ch. 2: Create a Test Set; ch. 3: Measuring Accuracy Using Cross-Validation* | **HW 2 due Sunday 9/13 11:59pm** | |
| **09/15/2026** | 3 | **Tuesday** | **Day 5: Metrics Beyond Accuracy - ROC vs PR, Calibration, Thresholds** | *ch. 3: Performance Measures* | | |
| **09/17/2026** | 3 | **Thursday** | **Day 6: Bagging and Random Forests** | *ch. 6: Voting Classifiers; Bagging and Pasting; Random Forests* | **HW 3 due Sunday 9/20 11:59pm** | **Unit 2: Ensemble Methods.** |
| **09/22/2026** | 4 | **Tuesday** | **Review Day (in class)** | *review Days 1-6* | | **Pause and reflect on Units 1-2 so far. Bring questions.** |
| **09/24/2026** | 4 | **Thursday** | **Day 7: Boosting - Gradient Boosting and XGBoost** | *ch. 6: Boosting; Stacking* | | |
| **09/29/2026** | 5 | **Tuesday** | **Day 8: The Full Pipeline - Preprocessing, Search, Model Selection** | *ch. 2 (all)* | **HW 4 due Friday 10/2 11:59pm** | |
| **10/01/2026** | 5 | **Thursday** | **Catch-Up Day (in class)** | *review ch. 1-6* | **Exam 1 due Monday 10/5 11:59pm** | **Catch up and review for Exam 1 (Units 1-2). Exam 1 released after class today (take-home).** |
| **10/06/2026** | 6 | **Tuesday** | **Day 9: From Logistic Regression to a Neuron - Tensors & Autograd** | *ch. 9: From Biological to Artificial Neurons; ch. 10: PyTorch Fundamentals* | | **Unit 3: Neural Networks.** |

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| **10/08/2026** | 6 | **Thursday** | **Day 10: MLPs in PyTorch - Writing the Training Loop by Hand** | *ch. 10: Implementing a Regression MLP; Mini-Batch Gradient Descent* | **HW 5 due Sunday 10/11 11:59pm** | |
| **10/13/2026** | 7 | **Tuesday** | *NO CLASS - Fall Break* | | | |
| **10/15/2026** | 7 | **Thursday** | **Day 11: Backpropagation, Activations, and Initialization** | *App. A: Autodiff; ch. 11: Glorot and He Initialization; Better Activation Functions* | **HW 6 due Sunday 10/18 11:59pm** | |
| **10/20/2026** | 8 | **Tuesday** | **Day 12: Optimizers, Learning-Rate Schedules, Batch Normalization** | *ch. 11: Batch Normalization; Faster Optimizers; Learning Rate Scheduling* | | |
| **10/22/2026** | 8 | **Thursday** | **Day 13: Deep-Net Regularization - Dropout, Early Stopping, Augmentation** | *ch. 11: Avoiding Overfitting Through Regularization* | **HW 7 due Sunday 10/25 11:59pm** | **Final project teams assigned.** |
| **10/27/2026** | 9 | **Tuesday** | **Day 14: Convolutional Neural Networks - Convolution, Pooling, Architectures** | *ch. 12: Convolutional Layers; Pooling Layers; CNN Architectures* | | **Unit 4: Representations.** |
| **10/29/2026** | 9 | **Thursday** | **Day 15: Transfer Learning - Fine-Tuning a Pretrained Vision Model** | *ch. 12: Pretrained Models for Transfer Learning* | **HW 8 due Sunday 11/1 11:59pm** | |
| **11/03/2026** | 10 | **Tuesday** | **Day 16: Embeddings and Sequences - Why RNNs Fail at Long Range** | *ch. 13: LSTMs; GRUs; ch. 14: Embeddings* | | |
| **11/05/2026** | 10 | **Thursday** | **Catch-Up Day (in class)** | *review ch. 9-14* | **Exam 2 due Monday 11/9 11:59pm** | **Catch up and review for Exam 2 (Units 3-4). Exam 2 released after class today (take-home). Final project proposals due.** |
| **11/10/2026** | 11 | **Tuesday** | **Day 17: Attention from Scratch** | *ch. 14: Attention Mechanisms* | | **Unit 5: Transformers & LLMs.** |
| **11/12/2026** | 11 | **Thursday** | **Day 18: The Transformer Block** | *ch. 15: Attention Is All You Need (Positional Encodings; Multi-Head Attention)* | **HW 9 due Sunday 11/15 11:59pm** | |
| **11/17/2026** | 12 | **Tuesday** | **Day 19: Build and Train a Tiny GPT** | *ch. 15: Building an English-to-Spanish Transformer* | | |
| **11/19/2026** | 12 | **Thursday** | **Day 20: Tokenization, Pretraining vs Fine-Tuning, and Scaling** | *ch. 14: Tokenization; ch. 15: Encoder-Only and Decoder-Only Transformers* | **HW 10 due Sunday 11/22 11:59pm** | |

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| **11/24/2026** | 13 | **Tuesday** | **Day 21: Using LLMs - Retrieval-Augmented Generation and Evaluation** | *ch. 15: Fine-Tuning a Model Using the TRL Library; Off-the-Shelf Chatbot Models* | | **Final project work begins.** |
| **11/26/2026** | 13 | **Thursday** | *NO CLASS - Thanksgiving* | | | |
| **12/01/2026** | 14 | **Tuesday** | **Day 22: Limitations, Ethics, and Where the Field Is Going** | *ch. 16: Multimodal Transformers* | | |
| **12/03/2026** | 14 | **Thursday** | **Final Project Work (in class)** | | | **Team check-in with Dr. Bieri.** |
| **12/10/2026** | | **Thursday** | **FINAL EXAM - Team Project Presentations, 3:00pm** | | **Report and code due Wed 12/9 11:59pm** | **Teams present a complete ML project. Final exam slot set by the registrar.** |
| *Shading: alternating bands = regular weeks \| pale yellow = catch-up/review \| pale blue = project day \| pink = no class \| purple = finals. Readings: Geron, Hands-On Machine Learning with Scikit-Learn & PyTorch.* | | | | | | |