DATA 301: Introduction to Machine Learning - Fall 2026

DATE	WEEK	DAY	Lecture Topic	Reading (Geron)	Homework / Exams Due	Notes
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**	**Day 7: Boosting - Gradient Boosting and XGBoost**	*ch. 6: Boosting; Stacking*		
09/24/2026	4	**Thursday**	**Day 8: The Full Pipeline - Preprocessing, Search, Model Selection**	*ch. 2 (all)*	**HW 4 due Sunday 9/27 11:59pm**	
09/29/2026	5	**Tuesday**	**Catch-Up Day (in class)**	*review ch. 1-6*		**Catch up and review for Exam 1 (Units 1-2). Bring questions.**
10/01/2026	5	**Thursday**	**Day 9: From Logistic Regression to a Neuron - Tensors & Autograd**	*ch. 9: From Biological to Artificial Neurons; ch. 10: PyTorch Fundamentals*	**Exam 1 due Monday 10/5 11:59pm**	**Unit 3: Neural Networks. Exam 1 released after class today (take-home).**
10/06/2026	6	**Tuesday**	**Day 10: MLPs in PyTorch - Writing the Training Loop by Hand**	*ch. 10: Implementing a Regression MLP; Mini-Batch Gradient Descent*		
10/08/2026	6	**Thursday**	**Day 11: Backpropagation, Activations, and Initialization**	*App. A: Autodiff; ch. 11: Glorot and He Initialization; Better Activation Functions*	**HW 5 due Sunday 10/11 11:59pm**	

10/13/2026	7	**Tuesday**	*NO CLASS - Fall Break*			
10/15/2026	7	**Thursday**	**Day 12: Optimizers, Learning-Rate Schedules, Batch Normalization**	*ch. 11: Batch Normalization; Faster Optimizers; Learning Rate Scheduling*	**HW 6 due Sunday 10/18 11:59pm**	
10/20/2026	8	**Tuesday**	**Day 13: Deep-Net Regularization - Dropout, Early Stopping, Augmentation**	*ch. 11: Avoiding Overfitting Through Regularization*		
10/22/2026	8	**Thursday**	**Day 14: Convolutional Neural Networks - Convolution, Pooling, Architectures**	*ch. 12: Convolutional Layers; Pooling Layers; CNN Architectures*	**HW 7 due Sunday 10/25 11:59pm**	**Unit 4: Representations. Final project teams assigned.**
10/27/2026	9	**Tuesday**	**Day 15: Transfer Learning - Fine-Tuning a Pretrained Vision Model**	*ch. 12: Pretrained Models for Transfer Learning*		
10/29/2026	9	**Thursday**	**Day 16: Embeddings and Sequences - Why RNNs Fail at Long Range**	*ch. 13: LSTMs; GRUs; ch. 14: Embeddings*	**HW 8 due Sunday 11/1 11:59pm**	
11/03/2026	10	**Tuesday**	**Catch-Up Day (in class)**	*review ch. 9-14*		**Catch up and review for Exam 2 (Units 3-4). Final project proposals due.**
11/05/2026	10	**Thursday**	**Day 17: Attention from Scratch**	*ch. 14: Attention Mechanisms*	**Exam 2 due Monday 11/9 11:59pm**	**Unit 5: Transformers & LLMs. Exam 2 released after class today (take-home).**
11/10/2026	11	**Tuesday**	**Day 18: The Transformer Block**	*ch. 15: Attention Is All You Need (Positional Encodings; Multi-Head Attention)*		
11/12/2026	11	**Thursday**	**Day 19: Build and Train a Tiny GPT**	*ch. 15: Building an English-to-Spanish Transformer*	**HW 9 due Sunday 11/15 11:59pm**	
11/17/2026	12	**Tuesday**	**Day 20: Tokenization, Pretraining vs Fine-Tuning, and Scaling**	*ch. 14: Tokenization; ch. 15: Encoder-Only and Decoder-Only Transformers*		
11/19/2026	12	**Thursday**	**Day 21: Using LLMs - Retrieval-Augmented Generation and Evaluation**	*ch. 15: Fine-Tuning a Model Using the TRL Library; Off-the-Shelf Chatbot Models*	**HW 10 due Sunday 11/22 11:59pm**	
11/24/2026	13	**Tuesday**	**Day 22: Limitations, Ethics, and Where the Field Is Going**	*ch. 16: Multimodal Transformers*		**Final project work begins.**
11/26/2026	13	**Thursday**	*NO CLASS - Thanksgiving*			

12/01/2026	14	**Tuesday**	**Final Project Work (in class)**			**Team check-in with Dr. Bieri.**
12/03/2026	14	**Thursday**	**Final Project Work (in class)**			**Practice presentations.**
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.						