Course Schedule

Fall 2026 · Tuesday & Thursday, 12:30–1:45 p.m.

Thirty-one class meetings run from **Tuesday, August 25** through **Thursday, December 10, 2026**. Chapter numbers refer to Prince, *Understanding Deep Learning* (MIT Press, 2024).

Read the assigned chapter **before** the first meeting of the week. Lecture time is spent on the parts that are hard to get from reading alone: derivations, failure modes, and code. Weekly assignments are posted in Blackboard with their own due dates; the **Due** column below carries only the exam and project milestones.

Weekly Plan

Week	Dates	Topic	Reading	Due
1	Aug 25, 27	Introduction; supervised learning	Ch. 1–2	—
2	Sep 1, 3	Mathematical & Python background	App. B	—
3	Sep 8, 10	Shallow neural networks	Ch. 3	—
4	Sep 15, 17	Deep neural networks	Ch. 4	—
5	Sep 22, 24	Loss functions	Ch. 5	—
6	Sep 29, Oct 1	Fitting models	Ch. 6	—
7	Oct 6, 8	Gradients & initialization	Ch. 7	**Proposal**
8	Oct 13, 15	Measuring performance	Ch. 8	—
9	Oct 20, 22	Midterm review; **midterm Oct 22**	Ch. 1–7	**Midterm**
10	Oct 27, 29	Regularization; convolutional networks	Ch. 9–10	—
11	Nov 3, 5	Residual networks; transformers	Ch. 11–12	**Paper choice**
12	Nov 10, 12	Large language models	Ch. 12 + notes	**Progress**
13	Nov 17, 19	Graph neural networks	Ch. 13	—
14	Nov 24	VAEs & GANs *(no class Nov 26)*	Ch. 15, 17	—

Week	Dates	Topic	Reading	Due
15	Dec 1, 3	Diffusion models; presentations begin	Ch. 18	—
16	Dec 8, 10	Student presentations	—	**Report Dec 14**

Meeting-by-Meeting Detail

Part I — Foundations

Date	Session	Topic
Tue, Aug 25	1	Course overview; what deep learning is and is not
Thu, Aug 27	2	Supervised learning: models, parameters, training
Tue, Sep 1	3	Linear algebra and calculus you actually need
Thu, Sep 3	4	Probability refresher; PyTorch tensors and autograd
Tue, Sep 8	5	Shallow networks: one hidden layer, ReLU, linear regions
Thu, Sep 10	6	Universal approximation; shallow networks in PyTorch
Tue, Sep 15	7	Composing networks; matrix notation for deep models
Thu, Sep 17	8	Depth vs. width; counting linear regions

Part II — Training Neural Networks

Date	Session	Topic
Tue, Sep 22	9	Maximum likelihood; recipe for constructing losses
Thu, Sep 24	10	Regression, binary and multiclass classification losses
Tue, Sep 29	11	Gradient descent; loss surfaces and local minima
Thu, Oct 1	12	Stochastic gradient descent, momentum, Adam
Tue, Oct 6	13	Backpropagation derived and implemented from scratch
Thu, Oct 8	14	Vanishing/exploding gradients; He and Glorot initialization
Tue, Oct 13	15	Training, validation, and test error; the bias–variance trade-off
Thu, Oct 15	16	Double descent; hyperparameter search; midterm review
Tue, Oct 20	17	Midterm review
Thu, Oct 22	18	**Midterm exam**
Tue, Oct 27	19	Regularization: explicit and implicit; early stopping, ensembles, dropout, noise, transfer learning

! Midterm Exam — Thursday, October 22

In class, multiple-choice, closed book, covering Chapters 1–7.

Part III — Architectures

Date	Session	Topic
Thu, Oct 29	20	Convolution, pooling, and image classification
Tue, Nov 3	21	Residual connections, batch norm, and modern CNNs
Thu, Nov 5	22	Self-attention and the transformer block; positional encoding; encoder, decoder, and encoder–decoder models
Tue, Nov 10	23	Pretraining, fine-tuning, and scaling laws
Thu, Nov 12	24	Tokenization, RoPE, KV caching, and inference efficiency
Tue, Nov 17	25	Graph representation; permutation equivariance
Thu, Nov 19	26	Graph convolutions; node, edge, and graph-level tasks

Part IV — Generative Models & Presentations

Date	Session	Topic
Tue, Nov 24	27	Latent variable models: VAEs and GANs
Thu, Nov 26	—	*No class — Thanksgiving holiday*
Tue, Dec 1	28	Denoising diffusion: forward process, reverse process, sampling
Thu, Dec 3	29	Student presentations
Tue, Dec 8	30	Student presentations
Thu, Dec 10	31	Student presentations; course wrap-up

NDSU Academic Calendar Dates

Drawn from the NDSU Fall 2026 academic calendar.

Date	Event
Mon, Aug 24	Classes begin at 4:00 p.m.
Tue, Aug 25	First full day of classes
Wed, Sep 2	Last day to add; last day for no-record drop at 100% refund
Mon, Sep 7	Labor Day — no classes
Mon, Sep 14	Last day to request audit or pass/fail
Mon, Sep 21	Enrollment census
Fri, Oct 16	Grades of ‘Incomplete’ convert to ‘F’
Wed, Nov 11	Veterans Day — no classes
Fri, Nov 13	Last day to drop with a ‘W’ record
Wed–Fri, Nov 25–27	Thanksgiving holiday — no classes
Mon–Fri, Dec 7–11	Dead Week
Fri, Dec 11	Last day of Fall classes
Mon–Fri, Dec 14–18	Final examinations

Labor Day and Veterans Day both fall on non-class days this semester, so Thanksgiving is the only holiday that removes a meeting from our Tuesday/Thursday slot.