

Machine Learning

DATA 571

Last modified: 2026-10-23

Preface

This website collects the lecture notes for DATA 571¹, “Machine Learning”, as taught in Fall Quarter 2026 at Western Washington University² by Douglas Ezra Morrison³.

We consolidated these notes from three earlier sets of materials:

- Kameron Decker Harris⁴’s notes from 2022
- Brian Hutchinson⁵’s notes, slides, and videos from Fall 2024 and Fall 2025
- Logan Sizemore⁶’s Spring 2025 lecture slides

Each chapter’s collapsed **Source** note records which of them it draws on.

The notes run from the introductory ideas to theory, one topic at a time. Course Overview sets up the vocabulary, and A First Model and Generalization works through a first example.

The supervised chapters follow. Linear regression comes first. Gradient descent, regularization and model selection each apply to every model after them. Logistic regression turns to classification.

Support vector machines and neural networks are two more classifiers, and attention and transformers extends neural networks to sequence data and the models built from it. Non-parametric models closes the supervised sequence with methods that fit either task, and ensemble methods combines many such models into one.

Unsupervised Learning then uses no labels, and semi-supervised learning handles the mixture of labeled and unlabeled data that most real problems actually present. The last four chapters — Metrics, ML Experimentation, Theory and Ethics and Fairness — cover how to measure, experiment with, reason about and take responsibility for all of them. Appendices follow: links to the mathematical prerequisites, probability foundations, and statistical concepts the chapters assume.

How these pages were made

The original notes were handwritten. We typeset them as standalone LaTeX handouts, then converted those handouts to Quarto in one pass. One script compiled every TikZ diagram to SVG, and a second ran **pandoc** over each source and fixed the parts that **pandoc** does not convert: the highlighted section headings, the LaTeX color expressions, and the figure references.

We have since retired the LaTeX sources and the conversion scripts, so the content now lives in one place. They remain in the course’s version history if anyone needs them.

¹https://catalog.wvu.edu/preview_course_nopop.php?catoid=23&coid=166998

²<https://www.wvu.edu/>

³<https://d-morrison.github.io/>

⁴<https://cs.wvu.edu/harri267>

⁵<https://cs.wvu.edu/hutchib2>

⁶<https://www.logan-sizemore.com>

Reading these notes

Every chapter is available in three formats: as a web page, as RevealJS slides at `<chapter>-slides.html`, and as a printable PDF handout at `<chapter>-handout.pdf`. The links are in the right-hand margin of each page, under “Other Formats”.

The site has a light and a dark color theme; the toggle is at the right-hand end of the menu bar.

Most of each chapter is built from exercises and their solutions. Each exercise is a question, calculation or short analysis, and its solution follows on the next slide or below it on the page.

Reading on your own, treat each exercise as a prompt: commit to an answer before reading the solution. These notes were written for a room where the pause happened out loud, so on the page you have to supply it yourself.

Contributing

Changes to both substance and style are welcome. In particular, the color themes could use some fine-tuning, which is beyond the instructor’s expertise. Send suggestions by email or through the anonymous feedback form⁷.

⁷<https://docs.google.com/forms/d/e/1FAIpQLScJoI2iwffUXm8Suy7oCDvehnNawjmQ-Bxm2i-6LsiZN5FFrA/viewform>