

# CS 4320: Machine Learning

## Spring 2024 Schedule

| Day       | Topic  | Reading | Work Due                            |
|-----------|--|---------|-------------------------------------|
| Jan 9     |  |         |                                     |
| Jan 11    |  |         |                                     |
| W01       | Introduction to Machine Learning               |         |                                     |
| W01       | Working with data collections                  |         |                                     |
| W01       | Visualizing data                               |         |                                     |
| H Jan. 15 | <i>Martin Luther King Jr. Day</i> (no classes) |         |                                     |
| Jan 16    |  |         | <a href="#"><u>Assignment 1</u></a> |
| Jan 18    |  |         |                                     |
| W02       | Regression Models                              |         |                                     |
| W02       | Gradient Descent                               |         |                                     |
| Jan 23    |  |         | <a href="#"><u>Assignment 2</u></a> |
| Jan 25    |  |         |                                     |
| W03       | Data Processing Pipelines                      |         |                                     |
| W03       | Intro to Neural Networks                       |         |                                     |
| W03       | Perceptrons                                    |         |                                     |
| W03       | Multilayer Perceptrons                         |         |                                     |
| W03       | Back-propagation                               |         |                                     |
| Jan 30    |  |         | <a href="#"><u>Assignment 3</u></a> |
| Feb 1     |  |         |                                     |
| W04       | Neural Networks with Tensorflow and Keras      |         |                                     |
| W04       | Classification                                 |         |                                     |
| W04       | Performance Measures/Confusion Matrix          |         |                                     |
| W04       | Decision Trees                                 |         |                                     |
| Feb 6     |  |         | <a href="#"><u>Assignment 4</u></a> |
| Feb 8     |  |         |                                     |
| W05       | Cross-Validation                               |         |                                     |
| W05       | Bias vs Variance                               |         |                                     |
| W05       | Error Analysis                                 |         |                                     |
| W05       | Loss Functions                                 |         |                                     |
| W05       | Regularization                                 |         |                                     |
| W05       | Learning Curves                                |         |                                     |
| Feb 13    |  |         | <a href="#"><u>Assignment 5</u></a> |
| Feb 15    |  |         |                                     |
| W06       | Hyper-parameter searches                       |         |                                     |
| W06       | Support Vector Machines                        |         |                                     |
| H Feb. 19 | <i>President's Day</i> (no classes)            |         |                                     |
| Feb 20    |  |         | <a href="#"><u>Assignment 6</u></a> |
| Feb 22    |  |         |                                     |
| W07       | Ensembles                                      |         |                                     |
| W07       | Forests  |         |                                     |
| W07       | Boosting                                       |         |                                     |
| W07       | Neural Networks for Classification             |         |                                     |
| Feb 27    |  |         | <a href="#"><u>Assignment 7</u></a> |
| Feb 29    |  |         |                                     |
| W08       | Action Policies                                |         |                                     |
| W08       | Value Iteration                                |         |                                     |
| W08       | Markov Chains                                  |         |                                     |

|             |                                  |  |                             |
|-------------|----------------------------------|--|-----------------------------|
| W08         | Markov Decision Process          |  |                             |
| W08         | Q-Values                         |  |                             |
| W08         | Temporal Difference Learning     |  |                             |
| Mar 5       |                                  |  | <b><u>Assignment 8</u></b>  |
| Mar 7       |                                  |  |                             |
| W09         | Temporal Difference Q-Learning   |  |                             |
| H Mar 11-15 | <i>Spring Break</i> (no classes) |  |                             |
| Mar 19      |                                  |  | <b><u>Assignment 9</u></b>  |
| Mar 21      |                                  |  |                             |
| W10         | Neural Networks                  |  |                             |
| W10         |                                  |  |                             |
| Mar 26      |                                  |  | <b><u>Assignment 10</u></b> |
| Mar 28      |                                  |  |                             |
| W11         | Neural Networks                  |  |                             |
| W11         |                                  |  |                             |
| Apr 2       |                                  |  | <b><u>Assignment 11</u></b> |
| Apr 4       |                                  |  |                             |
| W12         | Neural Networks                  |  |                             |
| W12         |                                  |  |                             |
| Apr 9       |                                  |  | <b><u>Assignment 12</u></b> |
| Apr 11      |                                  |  |                             |
| W13         | Neural Networks                  |  |                             |
| W13         |                                  |  |                             |
| Apr 16      |                                  |  | <b><u>Assignment 13</u></b> |
| Apr 18      |                                  |  |                             |
| W14         | Neural Networks                  |  |                             |
| W14         |                                  |  |                             |
| Apr 23      |                                  |  | <b><u>Assignment 14</u></b> |
| W15         | Neural Networks                  |  |                             |
| W15         |                                  |  |                             |
| Apr 25      | <i>Last Day of Classes</i>       |  |                             |
| Apr 26      | <i>Reading Day</i> (no classes)  |  |                             |
|             |                                  |  | <b><u>Assignment 15</u></b> |
| Apr 30      | Final Exam 9:00 am - 10:50 am    |  | <b>Final Exam</b>           |

Class announcements may modify schedule from that listed above.