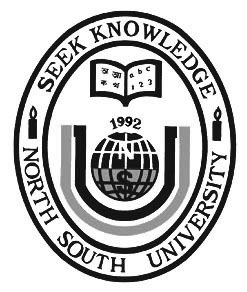
North South University

Department of Electrical and Computer Engineering

CSE 445.2: Machine Learning

Course Outline – Fall 2022

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| **Instructor:** Intisar Tahmid Naheen  **Office Location:** SAC 1185  **Email:** intisar.naheen@northsouth.edu  **Office hours:** On Google Meet via prior appointment or | **Class hours:** 3:00PM – 4:00PM  **Classroom:** SAC513  **Credit:** 3 credit hours.  **Prerequisites:** CSE 215, MAT 361 |

**Course Description**

This course will introduce students to the core concepts employed in machine learning to solve various problems in artificial intelligence. Students will learn the theory behind a range of machine learning systems, and put them to practice in tackling problems in natural language processing or computer vision. Topics introduced in the course includes linear regression, logistic regression, classification, support vector machines, decision trees, ensemble learning, dimensionality reduction, clustering, and neural networks. Advanced topics such as deep learning and reinforcement learning may be covered depending on student interest and time.

**Course Objectives**

Upon completion of this course, students will be able to:

1. Define Machine Learning, and the fundamental concepts of Machine Learning Systems
2. Understand Model selection and model evaluation
3. Understand classification-based and regression-based learning methods and their use cases
4. Understand unsupervised learning techniques and apply in practice

**Textbook:** “Hands-on Machine Learning with Scikit-Learn, Keras, & TensorFlow”, Aurelien Geron, 2nd Edition [GitHub: <https://github.com/ageron/handson-ml> ]

**Reference Books:** “Pattern Recognition & Machine Learning”, Chistopher Bishop

“Elements of Statistical Learning”, Friedman et al, 2nd Edition

“An Introduction to Statistical Learning”, Tibshirani et al

**Marks distribution (tentative):**

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| --- | --- |
| Attendance | **5%** |
| Assignments | **10%** |
| Midterm | **20%** |
| Final Exam | **20%** |
| Project | **45%** |

**Exams:** Exams will be announced a week in advance, and will be held on Socrative. Exams will be conducted over Google Meet during lecture hours, and students are required to have their video feed on during exams.

**Project:** You will explore a research topic in your area of interest, write a **paper** to summarize the results of your research, and make a brief **presentation** in class. Depending on the topic, the project can be application-oriented, or theory-oriented. You are highly encouraged to read ahead on a topic of interest on an AI related field.

**Grading policy:** Depending on the overall performance of the class, I will **curve** the grades. But it is unlikely to differ significantly from the NSU grading outline provided below. Aim high for maximum safety.

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| **Numerical Scores** | **Letter Grade** | **Grade Points Per Credit** |
| 93 and above | A Excellent | 4.0 |
| 90 – 92 | A- | 3.7 |
| 87 – 89 | B+ | 3.3 |
| 83 – 86 | B Good | 3.0 |
| 80 – 82 | B- | 2.7 |
| 77 – 79 | C+ | 2.3 |
| 73 – 76 | C Average | 2.0 |
| 70 – 72 | C- | 1.7 |
| 67 – 69 | D+ | 1.3 |
| 60 – 66 | D Poor | 1.0 |
| Below 60 | F\* Failure | 0.0 |

**Academic Honesty:** Any means of unauthorized assistance in preparing materials which a student submits as original work is deemed to be cheating and constitutes grounds for disciplinary action. Instructors are expected to use reasonably practical means of preventing and detecting cheating. Any student judged to have engaged in cheating might receive a reduced grade for the work in question, a failing grade in the course, or such other lesser penalty, as the instructor deems appropriate. Serious instances may be referred to the Disciplinary Committee in the Office of the Vice Chancellor.