



## NORTH SOUTH UNIVERSITY

Department of Electrical and Computer Engineering

CSE 445: Machine Learning

Section – 6

Course Outline – Fall 2025

Instructor: Dr. Mohammad Mahmudul Alam (MLD) Office Location: SAC 924 Email: <a href="mailto:mohammad.alam05@northsouth.edu">mohammad.alam05@northsouth.edu</a> Office hours: ST (8:30 AM – 9:30 AM, 11:20 AM – 2:30 PM) Directions: Please be prepared before coming to the office hours and notify me via email.	Class hours: MW 4:20 PM – 5:50 PM Classroom: SAC 307 Credit: 3 credit hours Prerequisites: CSE 215, MAT 361
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### Course Description:

This course will introduce students to the core concepts employed in machine learning to solve various problems in machine learning. 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 include 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 students' interests and time.

### Course Outcomes (COs):

1. Gain insights into the ML algorithms – (Mid/Final/Quiz)
2. Pick the best solution to a problem using statistical analysis - (Quiz/Mid)
3. Be able to implement an ML project (Project)

Textbook(s): "Hands-on Machine Learning with Scikit-Learn, Keras & TensorFlow", Aurélien Géron, **3<sup>rd</sup> Edition**.

Reference Books: "Pattern Recognition & Machine Learning", Christopher Bishop, 2<sup>nd</sup> Edition  
"Elements of Statistical Learning", Friedman et.al., 2<sup>nd</sup> Edition  
"An Introduction to Statistical Learning", Tibshirani et. al.

### Marks Distribution:

Attendance	10%
Quizzes	20%
Project	20%
Midterm	25%
Final Exam	25%

**Attendance:** Attendance is crucial, as it accounts for 10% of your final grade. Please make sure to arrive on time. Each student is allowed up to 4 absences. After that, your attendance score will be calculated on a linear scale from 0 to 10. To earn a full 10/10, you must attend at least 20 class sessions.

Quizzes: There will be a total of 4 quizzes. The **best 3** will be counted towards the final grading.

Project: You will explore a research topic in your area of interest, review literature, write a paper to summarize your results, and make a brief presentation in class. A project can be both theory- or application-oriented. You are highly encouraged to start reading ahead of topics of interest on ML-related topics.

Week Plan (Tentative):

Class	Lecture ID	Topics
1	Lecture 01	Introduction to Machine Learning
2	Lecture 02	Linear Regression
3	Lecture 03	Logistic Regression
4	Exam	Quiz 1 + Discussion
5	Lecture 04	Classification
6	Lecture 05	Model Evaluation + Project proposal due before class (Soft copy on Canvas)
7	Lecture 06	Support Vector Machines
8	Exam	Quiz 2 + Discussion
9	Lecture 07	Decision Trees & K-Nearest Neighbor
10	Lecture 08	Midterm Review
11	Exam	Midterm Exam
12	Lecture 09	Clustering: KMeans
13	Lecture 10	Dimensionality Reduction
14	Lecture 11	Ensemble Learning & Random Forest
15	Exam	Quiz 3 + Discussion
16	Lecture 12	Neural Networks + Project update due before class (Hard copy in class)
17	Lecture 13	Convolutional Neural Networks 1
18	Lecture 14	Convolutional Neural Networks 2
19	Lecture 15	Model Training and Optimization
20	Exam	Quiz 4 + Discussion
21	Lecture 16	Recurrent Neural Networks
22	Lecture 17	Final Exam Review
23	Exam	Project Presentation 1
24	Exam	Project Presentation 2
Final Exam		

Grading Policy: As per NSU grading policy available in

<https://www.northsouth.edu/academic/grading-policy.html>

Academic Honesty:

Any means of unauthorized assistance in preparing materials that 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.*