DSBA 6156 U90: Applied Machine Learning

Spring 2025

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Contact Information

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Course Description

This course is focused on building a deep understanding of machine learning methods and developing the practical skills required to build models and systems capable of transforming raw data into actionable outputs. From data preprocessing to model development and deployment, students will learn to design, develop, and evaluate ML solutions for real-world challenges.

Objectives of the Course

Special attention will be paid to the application and implementation of machine learning methods. Student will learn:

1.) the core principles, concepts, and methods of machine learning;

2.) how to assess and evaluate learning methods (as well as model risks and model failures);

3.) how to design, develop, deploy, and utilize machine learning solutions to solve real-world challenges;

4.) how to present and communicate findings and results as actionable outputs.

Key topics include traditional machine learning techniques, deep learning advancements, and recent generative models.

Instructional Method

Materials presented in this course will be covered through lectures and use cases. Key topics will be further explored through hands-on application of use cases in Python. Students will gain both the theoretical understanding of machine learning concepts, as well as the experience of putting such concepts and principles into practice.

Core Textbook

"Machine Learning for Predictive Data Analytics: Algorithms, Worked Examples, and Case Studies," by John D. Kelleher, Brian Mac Namee, Aoife D'Arcy, Second Edition, 2020, Massachusetts Institute of Technology.

Topics and Key Dates

Introduction:	8/20
Data Preparation and Exploration	8/27
Guest Speaker, EDA [Recap], Information-based Learning:	9/3
Information-based Learning / Project Pitch	9/10
Information-based Learning [Advanced]	9/17
Similarity-based Learning	9/24
Similarity-based Learning [Recap], Error-based Learning	10/1
Error-based Learning, Probability-based Learning, Exam Review	10/8
Midterm Exam:	10/15
Exam Recap / Deep Learning - Fundamentals / Project Update:	10/22
Deep Learning - Extended:	10/29
Deep Learning / Computer Vision:	11/5
Model Explainability / Deployment	11/12
LLMs / Self-supervised Learning:	11/19

Reinforcement Learning / Unsupervised Learning	12/3
Final Exam / Final Project Submission:	12/10

Course Requirements and Grading Policy

Assignments: 25%

Project: 25%

Midterm Exam: 25%

Final Exam: 25% (not cumulative)

Additional Policies

Attendance: Students are expected to attend all class meetings and to arrive before the class starts. Class topics are integrated, with each week building on prior weeks. Failure to attend or to arrive on time can adversely affect both individual performance, ability to contribute to the group project, and the earned letter grade. If a student misses a class due to work or other reasons, it is their responsibility to get notes from peers; instructors do not hold extra repeat class sessions. Students will be allowed to miss no more than 3 classes without affecting their final grade. For every 3 absences the final grade will be lowered by one letter grade.

Grade Discussions: The instructor will discuss grades only in person (and not via telephone or e-mail) and only with the student (not with parents, spouses, etc). Office hours are listed in the syllabus.

Electronic Devices: Students are not allowed to use any electronic devices during the class, unless otherwise instructed by the instructor.

Academic Integrity

All students are expected to adhere to the UNC Charlotte Code of Student Academic IntegrityLinks to an external site. (http://legal.uncc.edu/policies/ps-105.htmlLinks to an external site.) as specified in the current CatalogLinks to an external site. (http://catalog.uncc.edu/Links to an external site.). Among other things, this code forbids cheating, fabrication or falsification of information, multiple submission of

academic work, plagiarism, abuse of academic materials, and complicity in academic dishonesty.

Inclement Weather

University Policy Statement #13 states the University is open unless the Chancellor announces that the University is closed. The inclement weather hotline number to call is 704-786-2877. In the event of inclement weather, check your email the morning of class. The instructors will use their best judgment as to whether class should be held understanding that some of you commute from far away and the instructors will notify you by email if class is cancelled.