Course Syllabus

Edit

# DSBA 6156 U91: Applied Machine Learning

Fall 2024

Rick Chakra

### Contact Information

Web page: https://www.linkedin.com/in/rick-chakra/ (https://www.linkedin.com/in/rick-chakra/)

Email: rchakra4@charlotte.edu

Office: Complex Systems Lab, Colvard

Phone: 980-244-9255

Office Hours: Friday - by appointment

### Course Description

This course is focused on building a deep understanding of machine learning methods and developing the practical skills required to transform raw data into actionable insights. From data preprocessing to model development and deployment, students will learn to craft solutions for real-world challenges.

### Objectives of the Course

Organizations, across all industries, are collecting massive amounts of data at an accelerating pace. This brings many challenges, including data processing, storage, transformation, analysis, reporting, and operationalization. This course will cover the various aspects of these processes, with a focus on extracting actionable insights from the data. Special attention will be paid to statistical methods /

machine learning methods that enable the analysis of data. Students will learn (a) the core principles, concepts, and methods of machine learning; (b) how to assess and evaluate learning methods; (c) how to design, develop, deploy, and utilize machine learning solutions to solve real-world challenges; and (d) how to present and communicate findings and results as actionable insights.

**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.

**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 (to be finalized and aligned with other section)**

| | |
|---|---|
| Introduction: | 8/21 |
| Data Preparation and Exploration: | 8/28 |
| Information-based Learning: | 9/4 |
| Similarity-based Learning / Project Pitch: | 9/11 |
| Error-based Learning: | 9/18 |
| Error-based Learning Continued: | 9/25 |
| Probability-based Learning / Exam Review: | 10/2 |
| Midterm Exam: | 10/9 |
| | |

| | |
|---|---|
| Model Explainability (2nd Floor Lecture Hall) / Exam Recap / Project Update: | 10/16 |
| Deep Learning - Fundamentals: | 10/23 |
| Deep Learning - Extended: | 10/30 |
| Flex / Project Update: | 11/6 |
| Reinforcement Learning / Self-supervised / Unsupervised Learning: | 11/13 |
| LLMs and Model Deployment: | 11/20 |
| Flex / Final Project Presentation: | 12/4 |
| Final Exam: | 12/11 |

**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 Integrity (http://legal.uncc.edu/policies/ps-105.html)** (**http://legal.uncc.edu/policies/ps-105.html (http://legal.uncc.edu/policies/ps-105.html)**) as specified in the current **Catalog (http://www.provost.uncc.edu/Catalogs/)** (**http://catalog.uncc.edu/ (http://catalog.uncc.edu/)**). 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.

# Course Summary:

| Date | Details | Due |
|---|---|---|
| Wed Feb 21, 2024 | **Lab 5 Probability based Learning** (https://uncc.instructure.com/courses/223259/assignments/2298465) | due by 11:59pm |
| Wed Feb 28, 2024 | **Assignment 2** (https://uncc.instructure.com/courses/223259/assignments/2298454) | due by 5:30pm |