MATH:200 Foundations of Data Science

Instructor: Dr. Ben Mackey

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Office Hours: MWF 10:45-11:45

Course description: This course provides students a practical introduction to the field of Data Science and familiarizes them with the essential facets of the data scientist profession. This includes a grounding on data-based reasoning, problem formulation, data collection, data pre-processing, data analytics, visualization, and use of data analysis for decision-making.

Learning objectives:

By the end of the course, students will be able to:

1. Assess and articulate the relevance of data for a particular business or societal problem.
2. Collect, store, and retrieve data originating from multiple sources.
3. Preprocess diverse data into standardized formats
4. Undertake exploratory data analysis to generate insights from the data.
5. Visualize data into charts and other visual representations for generating insights and supporting decision making.

Textbook: A Hands-on Introduction to Data Science, by Chirag Shah, published by Cambridge University Press.

Tentative outline for the semester

Week	Title/Topic(s)	Sections/chapters in the book
1	• Introduction to the course • What is Data Science?	• Sections 1.1-1.5
2	• Hands-on with Data Science problems	• Section 1.7
3	• Data types • Data collections and storage	• Sections 2.1-2.3
4	• Computational thinking • Introduction to Python	• Section 1.6 • Sections 5.1-5.3
5	• Data pre-processing • Data cleaning	• Section 2.4
6	• Basics of statistics	• Section 3.1-3.2
7	Midterm	
8	• Project management for Data Science	

	• Assignment of final projects	
9	• Diagnostic analysis • Predictive analysis • Prescriptive analysis • Exploratory analysis	• Sections 3.3-3.7
10	• Mechanistic analysis • Correlation and regression	• Section 3.8
11	• Introduction to R	• Sections 6.1-6.3
12	• Introduction to databases	• Section 7.1-7.3
13	• Midterm	
14	• Introduction to Big Data, Machine Learning, Data Mining, and other advance topics.	
15	• *Project presentations and class wrap-up*	

Grading: Grades are determined by your performance on the two midterm exams (27% each), the final project (27%), and in-class activities (9%), and homework (10%). The following table gives you the weighted percentage you need to earn to receive each grade.

A	90% or more
B	80%-89%
C	70%-79%
D	60%-69%
F	56% or below

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Last day to drop class without "WD"	G/U	Sep 8, 2024
Last day to withdraw from 15 week session classes	G/U	Oct 13, 2024

For information on *"WHAT STUDENTS NEED TO KNOW,"* go to [What Students Need To Know : The University of Akron, Ohio (uakron.edu)](#) (see the list of items below).

- The Student Code of Conduct and academic misconduct
- Statement about the ethical use of ChatGPT and other AI tools
- Inclusive Excellence
- Title IX
- Sexual harassment and sexual violence
- Students with disabilities
- Religious accommodations for students
- ZipAssist

Use of Artificial Intelligence (AI) disclaimer:

You are not permitted to use any work product or submit any assignment that has been created in whole or in part using artificial intelligence, large language models, or the equivalent. Using AI in the manner described above is a Honor Code violation will be seen as academic misconduct. A penalty will be applied to your assignment or course overall in accordance with the office of student conduct.