DATA-170 Syllabus

Instructor: Dr. Durell Bouchard
Office Hours: MW: 10:50 AM - 11:50 AM or by appointment
Office: Trexler 365-C
E-Mail: bouchard@roanoke.edu
Phone: 375-4901

Course Objectives

The sheer volume of data we generate in our interactions with the digital world is staggering. In just one second, users create 347,222 posts on Instagram, upload 500 hours of video to YouTube, and place orders for 6,659 packages on Amazon. To comprehend the immense quantities of information generated, we require sophisticated algorithms to simplify, analyze, and visualize the data. Additionally, the companies collecting this digital information need data scientists who possess a deep understanding of these algorithms. This course aims to introduce you to the tools and techniques essential for becoming a data scientist. You will gain proficiency in applying machine learning to vast datasets to explore data and make predictions.

Intended Learning Outcomes: By the end of the course, successful students will be able to:

1. Develop programs utilizing machine learning to make predictions.
2. Properly format and manage data.
3. Report and interpret the performance of prediction models.

Course Content

Prerequisites: CPSC-120

Project: The course will culminate in a project utilizing machine learning to create a model capable of making predictions from data. This project is designed to allow you to apply all the skills and techniques youâ€™ve learned throughout the semester to explore a dataset that piques your interest.

Tests: Before beginning the project, we will learn the requisite programming skills. We will have two tests on these skills: one on the Python programming language and one on vectorized programming.

Activities: During class, programming activities will provide you with a structured experience in vecorized programming, data cleaning, and analysis. activities connect the reading and lectures to the practice of data science and prepare you for the assignments.

Co-curricular: The Department of Mathematics, Computer Science, and Physics is offering a series of lectures designed to engage the campus community in discussions of ongoing research, novel applications, and other issues within these disciplines. You may submit up to two papers reflecting on a talk you attend for extra credit.

Grading: Course grades are assigned based on the following weights and scale:

Grade Weights

Category	Weight
Project	20%
Tests	40%
Activities	40%

Grade Scale

Grade	Range	Grade	Range
A	93-100	C	73-76
A-	90-92	C-	70-72
B+	87-89	D+	67-69
B	83-86	D	63-66
B-	80-82	D-	60-62
C+	77-79	F	0-59

Course Policies

Attendance Policy: Attending class is crucial for your success in this course. If you anticipate being unable to attend class, email me before class to be excused.

Late Work: Unless specified otherwise, assignments must be submitted before the start of class on the due date. If you anticipate being unable to meet a deadline, email me before the deadline to request an extension. Unexcused late work will receive no credit.

Make-up Policy: Everyone is expected to take tests as scheduled. If you have an excused absence, email me to arrange a make-up. Unexcused absences will result in receiving no credit.

Academic Integrity: I expect everyone to follow the Academic Integrity policy detailed in the handbook Academic Integrity at Roanoke College. Please contact me if you have

questions about how these policies apply to our class. The bottom line is that all work you submit for a grade must be solely your own unless explicitly stated as group work.

Subject Tutoring: Subject Tutoring, located on the lower level of Fintel Library (Room 5), is open 4-9 PM, Sunday-Thursday. Subject Tutors are highly trained, current students who offer free, one-on-one (and small group) tutorials in over 80 courses taught at Roanoke College, including: Business, Economics, Mathematics, INQ 240, Modern Languages, Lab Sciences, and Social Sciences. Check out all available subjects and schedule 30- or 60-minute appointments at <www.roanoke.edu/tutoring>. If you have a question, feel free to stop by, or contact us at subject_tutoring@roanoke.edu or 540-375-2590. See you soon! soon!

Accessible Education Services: Accessible Education Services (AES) is located in the Goode-Pasfield Center for Learning and Teaching in Fintel Library. AES provides reasonable accommodations to students with documented disabilities. To register for services, students must self-identify to AES, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. Please contact Dustin Persinger, Assistant Director of Academic Services for Accessible Education, at 540-375-2247 or by e-mail at aes@roanoke.edu to schedule an appointment. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact Dustin Persinger at your earliest convenience to schedule an appointment and/or obtain your accommodation letter for the current semester.

Student Health & Counseling Services: Student Health & Counseling Services supports students through in-person health appointments, in-person counseling, 24/7 telehealth (TimelyCare), Therapy Assistance Online, as well as resources related to general wellness, LGBTQ+, sexual assault, substance abuse, and suicide prevention. Unmet health needs can negatively impact your performance in this course. Student Health & Counseling Services can help. Please see https://www.roanoke.edu/shcs for more information and to access services.

Diversity: I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability - and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming, and inclusive environment for every other member of the class.

Preferred Name/Pronoun: I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so I can make appropriate changes to my records.

Course Schedule

This course expects you to spend at least 12 hours of work each week inside and outside of class.

Date	Topic
Tuesday, January 14	Python - Introduction
Thursday, January 16	Python - For Loops
Tuesday, January 21	Python - Functions
Thursday, January 23	Python - Conditionals
Tuesday, January 28	Python - Strings
Thursday, January 30	Python - Lists
Tuesday, February 4	Python - Objects
Thursday, February 6	Python - Review
Tuesday, February 11	Python - Test
Thursday, February 13	Numpy - Introduction
Tuesday, February 18	Numpy - Array Operations
Thursday, February 20	Numpy - Array Indexing
Tuesday, February 25	Numpy - Array Shaping
Thursday, February 27	Numpy - Fancy Indexing
Spring Break	
Tuesday, March 11	Numpy - CSV I/O
Thursday, March 13	Numpy - Matplotlib
Tuesday, March 18	Numpy - Review
Thursday, March 20	Numpy - Test
Tuesday, March 25	Scikit - Introduction
Thursday, March 27	Scikit - Catagorical Data
Tuesday, April 1	Scikit - Pandas
Thursday, April 3	Scikit - Preparing Data
Tuesday, April 8	Scikit - Feature Selection
Thursday, April 10	Scikit - Fine Tuning
Tuesday, April 15	Scikit - Project
Thursday, April 17	Scikit - Project
Monday, April 28 (10:00 AM)	Project Presentations