

CS 620 Syllabus

Course Information

- Instructor(s): Bhanuka Mahanama
- CS 620: Introduction to Data Science and Analytics
- Fall 2026 – August 24 – December 11
- Synchronous, Monarch Hall 2111, Tuesdays and Thursdays 3:00 – 4:15 PM
- Office Hours: Wednesdays 3:00 – 5:00 PM

Course Description

Catalog Description

Data science is an interdisciplinary blend of the analytical, computational, and statistical skills necessary to extract knowledge from large and complex sets of data. The proliferation of such data has led to an acute shortage of students with data science skills in the local, national, and global economy.

Course Description

This course will introduce students to this rapidly growing field of Data Science and equip them with some of its basic principles and tools as well as its general mindset. Students will learn concepts, techniques, and tools they need to deal with various facets of data science practices.

Prerequisites

There are no specific course prerequisites for this course. But, I expect you to be comfortable coding in Python and its associated libraries, and knowledge in linear algebra and statistics.

Required Materials

Required Textbook

- No textbook is required. All the key course content will be documented in Canvas Modules.

Supplemental Materials (Optional)

- A Hands-On Introduction to Data Science by Chirag Shah, Cambridge University Press, April 2, 2020
- Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython, By William McKinney, O'Reilly; 2 edition (October 20, 2017)
- Data Science from Scratch: First Principles with Python by Joel Grus, O'Reilly 1st edition, 2015

Technology Requirements

- Canvas, Adobe Acrobat, Piazza, Python, JEdit.

Course Learning Objectives

- CLO1: Define and explain the key concepts and models relevant to data science.

- CLO2: Understand the processes of data science: identification of the problem to be solved, data collection, preparation, modeling, evaluation and visualization.
- CLO3: Develop an appreciation of the many techniques for data modeling.
- CLO4: Practice skills of using commercial and open-source tool such as Python and associated libraries for data analytics and visualization.

Course Schedule

	Module	Topics
Weeks 1-5	Module 1	Introduction
	Module 2	Libraries for Data Science
	Module 3	Data Elements
	Module 4	Data Wrangling
	Module 5	Semi-Structured Data
Weeks 6-10	Module 6	Text Data Analysis and Inference
	Module 7	Pattern Mining
	Module 8	Machine Learning (Part I)
	Module 9	Machine Learning (Part II)
	Module 10	Evaluation
Finals Week	Module 11	Final Exam

Grading Criteria

In this course, I will calculate your final grade based on the following categories:

Criteria	Percentage/Points
Homework	25%
Piazza Activities	15%
Final Exam	30%
Data Project	30%

Final Exam: Final examination will be a comprehensive (covering all the modules), online (delivered via Canvas) exam and will be scheduled during the finals week of the semester. On the week before final exam, I will post a study guide that will help students to prepare for the written examination. You may have one standard 8.5" by 11" piece of paper with any notes you deem appropriate or significant (front and back) for the final exam.

Homework: We will have several homework assignments, worth 25% of your overall grade.

Data Project: The data project is an opportunity to tackle a more challenging data science activity. Details, requirements, and submission information will be on the project section of the course web page. The goal of your data project is to apply the techniques learn in each week of the class towards a raw dataset (exploration, wrangling, machine learning, visualization). We are going to use Google Colab (Colaboratory) (<https://colab.research.google.com/>), a free Jupyter notebook environment that requires no setup and runs entirely in the cloud. With Colaboratory you can write and execute code, save and share your analyses, and access powerful computing resources, all for free from your browser.

Class Activities/Discussion Forum interactions: Class activities and participation in the discussion are both important to your success in the course. As one measure of your participation and course preparation, we will have class activities related to lecture topics to supplement the learning.

Grading Scale

Percentage	Letter Grade
100-94	A
90-93	A-
87-89	B+
84-86	B
80-83	B-
78-79	C+
74-77	C
70-73	C-
<59	F

Policy on Incomplete Grades

A grade of "I" indicates assigned work yet to be completed in a given course, or absence from the final examination, and is assigned only upon instructor approval of a student request. The "I" grade may be awarded only in exceptional circumstances beyond the student's control. The "I" grade becomes an "F" if not removed by the day grades are due for following term based on specific criteria: [Incomplete, Withdraws and Z grades](#).

Expectations

What you can expect from me, as your instructor:

- I will ensure the accuracy of the course content.
- I will provide clear guidelines on the course assignments.
- I will be available to answer your questions.
- I will provide meaningful feedback in a timely manner.
- I will do my best to create a worthwhile learning experience for all of my students.
- I will follow fair and clear evaluation guidelines for all the course assignments.
- I will do my best to prepare you for exams and assignments.

What I expect from you, as my student:

- You will complete all course readings and assignments in a timely manner.
- You will follow the ODU honor pledge.
- You will follow proper [netiquette](#).
- You will interact with your faculty and xmates professionally and respectfully.
- You will avoid sarcasm and inappropriate language, including the use of ALL CAPS.
- You will acknowledge your classmates' ideas and build on them to contribute to the discussion.

Course Policies

Attendance and Participation

It is extremely important for you to be engaged in the course; otherwise, you will wonder what happened to your tuition dollars. So, I encourage you to setup online meetings, ask questions and actively participate at the piazza discussion forum.

Piazza: All questions will be fielded through Piazza. The primary benefit is that for many questions everyone can see the answer and other students can answer as well. I will endorse good student responses. Additionally, I expect you to actively participate in online discussions at Piazza. You can post public or private messages that can only be seen by the instructor. You will be signed up with your odu email, but you may switch to another email.

Canvas: Canvas will be used primarily for course weekly module content and grade dissemination.

Email: Again, email should only be used in rare instances, I will probably point you back to Piazza if you have a question related to course materials and/or relevant to other students in the class.

If you send email to me (for any urgent matter such as health issue etc.), please be sure to include your name and the course number in the body of the e-mail. You should also use an appropriate subject line that looks like "CS-HW2" etc. Failure to follow these guidelines may result in delayed response.

Late Assignments

Due dates will be set to give ample time for completion of the assignments and will not be extended save for the unexpected and unlikely major, long-lived catastrophe. Start projects and homework early--last minute computer malfunctions will not be accepted as a reason for delaying a due date. Changes to a submission's due dates will be avoided because they are unfair to those students who have organized their time to complete the assigned work. Individual accommodations will be discussed if you have a valid medical excuse.

Unless otherwise specified by the instructor, Final Exam will be comprehensive, covering material from the entire course. There are no makeups or rescheduling of exam unless you have a plausible reason with appropriate document or verification. Rescheduling of exams must be arranged at least 3 days in advance. An exam missed without an acceptable excuse will be recorded as a grade of zero (0).

For Homework assignments, each late submission will incur a 5 points penalty per day. A missed submission without an acceptable excuse will be recorded as a grade of zero (0). No submission will be accepted after 3rd day and will be recorded as a grade of zero (0).

There will be no makeup for homework assignments or class activities. Class activities are due weekly by Sunday End-of-the-day (EOD).

Course Disclaimer

The course schedule and activities are subject to change. Changes will be posted as Announcements in Canvas.

University Policies

Code of Student Conduct and Academic Integrity

The [Office of Student Conduct & Academic Integrity](#) (OSCAI) oversees the administration of the student conduct system, as outlined in the Code of Student Conduct. Old Dominion University is committed to fostering an environment that is: safe and secure, inclusive, and conducive to academic integrity, student engagement, and student success. The University expects students and student organizations/groups to uphold and abide by standards included in the Code of Student Conduct. These standards are embodied within a set of core values that include personal and academic integrity, fairness, respect, community, and responsibility.

Honor Pledge

By attending Old Dominion University, you have accepted the responsibility to abide by the Honor Pledge:

I pledge to support the Honor System of Old Dominion University. I will refrain from any form of academic dishonesty or deception, such as cheating or plagiarism. I am aware that as a member of the academic community it is my responsibility to turn in all suspected violations of the Honor Code. I will report to a hearing if summoned.

Discrimination Policy

The purpose of this policy is to establish uniform guidelines in order to promote a work and education environment that is free from harassment and discrimination, as defined below, and to affirm the University's commitment to foster an environment that emphasizes the dignity and worth of every member of the Old Dominion University community. The [Discrimination Policy](#) details the process to address complaints or reports of retaliation, as defined by this policy.

Diversity and Inclusion

The [Division of Student Engagement & Enrollment Services](#) values the uniqueness of our Monarch community. The word "engagement" reflects our commitment to embrace the differences in our cultural backgrounds, perceptions, beliefs, traditions, world views, socio-economic status, cognitive and physical abilities.

We will strive to serve as the pre-eminent model for engaging every student to achieve their own success. Our core values are fueled by our responsibility and actions toward community development and engagement, cultural competence and understanding, physical and mental wellness and inclusion for every member of ODU. We will embrace our greatest strength - the diverse composition of our student body and workforce. For more information regarding diversity and inclusion, please visit the [Office of Intercultural Relations](#).

Educational Accessibility and Accommodations

Old Dominion University is committed to ensuring equal access to all qualified students with disabilities in accordance with the Americans with Disabilities Act. The [Office of Educational Accessibility](#) (OEA) is the campus office that works with students who have disabilities to provide and/or arrange reasonable accommodations.

The [Accommodations for Students with Disabilities](#) define the procedures used to accommodate student with disabilities. Students are encouraged to self-disclose disabilities that the Office of Educational Accessibility has verified by providing Accommodation Letters to their instructors early in the semester in order to start receiving accommodations. Accommodations will not be made until the Accommodation Letters are provided to instructors each semester

University Email Policy

With the increasing reliance and acceptance of electronic communication, email is considered an official means for University communication. Old Dominion University provides each student an email account for the purposes of teaching and learning, research, administration, and service. It is the responsibility of every eligible student to activate MIDAS, the Monarch Identification and Authorization System, in order to obtain email access. It is important that all students are aware of the expectations associated with email use as outlined in the [Student Email Standard](#). The email account provided by the University is considered to be an official point of contact for correspondence. Students are expected to check their official e-mail account on a frequent and consistent basis in order to stay current with University communications. Mail sent to the ODU email address may include notification of University-related actions, including academic, financial, and disciplinary actions. For more information about student email, please visit [Student Computing](#).

Withdrawal

A syllabus constitutes an agreement between the student and the course instructor about course requirements. Participation in this course indicates your acceptance of its teaching focus, requirements, and policies. Please review the syllabus and the course requirements as soon as possible. If you believe that the nature of this course does not meet your interests, needs or expectations, if you are not prepared for the amount of work involved – or if you anticipate assignment deadlines or abiding by the course policies will constitute an unacceptable hardship for you – you should drop the course by the drop/add deadline, which is listed in the [ODU Schedule of Classes](#). For more information, please visit the [Office of the University Registrar](#).

Privacy of Student Information

Old Dominion University recognizes its duty to uphold the public's trust and confidence, not only in following laws and regulations, but in following high standards of ethical behavior. Members of the Old Dominion University community are responsible for maintaining the highest ethical standards and principles of integrity. The [Code of Ethics](#) is a set of values-based statements that demonstrate the University's commitment to this goal. The [Privacy of Student Information](#) details Family Educational Rights & Privacy Act (FERPA), along with other information regarding privacy.

Use of AI Tools and Applications

You are welcome to use artificial intelligence (AI) tools and applications (such as ChatGPT, Gemini, etc.) in this class as they support the learning objectives of this course. Your use of AI tools must be documented, you must retain chat transcripts and submit with your assignments as an attachment. Contact me if you have any questions or concerns regarding this policy.

Student Acknowledgement

“I, _____ (Insert your Name and UIN), have completely read this syllabus and understand and agree to the course requirements”.

Signature and Date