

DATS 6501.81 – Data Science Capstone

Fall 2023

COURSE AND CONTACT INFORMATION

Section	81 (CRN: 47630)
Time	Mondays 3:30 – 5:20 pm
Location	DUQUES 259

INSTRUCTOR

Name: Dr. Edwin Lo
Office: Samson Hall 313 (easier to enter from Corcoran 2nd floor, thru end-of-hallway stairs)
Phone: 202-994-2496 (or No.1-EDWIN-LO = 661-339-4656)
Email: edwinlo@gwu.edu
Office hours: By appointment at calendly.com/edwinlo (In-person or conference calls. You can make back-to-backs if needed.)
Conf URL: gwu-edu.zoom.us/j/9806884100 (for appointments meeting virtually)

COURSE DESCRIPTION

The goal of the Capstone Project is for the students to apply the knowledge acquired throughout the GWU Data Science graduate program to solve a real-world problem, using real data. It typically starts from developing SMART questions and goes through the entire data science life cycle in multiple iterations.

The students will work either individually, or in small groups if approved by the instructor. There are a few outside group and projects that students can apply to. Watch out for such information and application deadlines. Students can also find other topics and projects at their choosing, subject to the final approval by the instructor.

LEARNING OUTCOMES

As a result of completing this course, students will be able to

1. understand and execute complete data science life cycles in solving real-world problems to provide findings and solutions.
2. work with the industry, government, non-governmental organizations (NGOs), or academic research groups to offer analyses and solutions to their problems.
3. interpret and communicate their work in organized and efficient manners to variety of audiences orally.
4. interpret and communicate their work in a well-organized written format, in the form of a report, journal paper, or conference paper.
5. respond to questions and criticism in poster and oral presentations.

PROJECT REQUIREMENTS

1. Demonstrate ability to carry out a data science project from end to end (life cycle).
2. Demonstrate proficiency in preparation and executing a presentation.
3. Demonstrate ability to carry out literature research and summarize the state of the art.
4. Demonstrate ability to translate project objectives into a realistic work plan.
5. Demonstrate ability to design and implement required software using tools such as Python, R, as well as traditional programming languages such as C, C++ and Java.

COURSE PREREQUISITE

Students may enroll in the Capstone course upon completion of all GWU Curriculum courses in the Data Science graduate program, or during the same semester the student is completing the last of these requirements.

SEMESTER SCHEDULE		
Date	Topics	Tasks due
Aug 28 th	Intro and Finding Data / Plagiarism / Fair use	
Sept 4 th	Labor day – No class	Project proposal (5%)
Sept 11 th	Elevator pitch / 5-min pitch (5%)	Weekly update #1
Sept 18 th	Weekly Standup #1	Weekly update #2
Sept 25 th	Weekly Standup #2	Weekly update #3
Oct 2 nd	Weekly Standup #3	Weekly update #4
Oct 9 th	Fall break – No class	Weekly update #5
Oct 16 th	Weekly Standup #4	Weekly update #6
Oct 23 rd	Weekly Standup #5 / Posters info	Weekly update #7
Oct 30 th	Weekly Standup #6	Weekly update #8
Nov 6 th	Weekly Standup #7	Weekly update #9
Nov 13 th	Weekly Standup #8	Weekly update #10
Nov 16 th	Weekly Standup #9 / Mock presentation	Weekly update #11
Nov 20 th	Thanksgiving break – No class	Weekly update #12
Nov 27 th	Mock presentation	Weekly update #13
Dec 4 th	Mock presentation	Weekly update #14
Dec 11 th Dec 8 th	FRIDAY 5-8pm Poster Session (20%)	
Dec 14 th	THURSDAY 9a-1p Presentation I (20%)	
Dec 15 th	FRIDAY 9a-1p Presentation II (20%)	
Dec 18 th	Report due (20%)	

GRADING

Your final grade will be determined by:

- ✓ Project Proposal (5%)
- ✓ Elevator (3-min) pitch (5%)
- ✓ Weekly reports (15%)
- ✓ Standups (15%)
- ✓ Poster Session (20%)
- ✓ Final Presentation (20%)
- ✓ Final Report (20%)

Letter Grades

A	A–	B+	B	B–	C+	C	C–	D+	D	F
≥ 93	90 – 92	87 – 89	83 – 86	80 – 82	77 – 79	73 – 76	70 – 72	67 – 69	60 – 66	< 60

DELIVERABLES

1. **Project proposal:** (5%) This is a 1-to-2-page proposal, outlining what topic and research questions (can be changed later) are being pursued, and at least an outline of the data source.
2. **Elevator / 5-min pitch:** (5%) With the research topic selected, try to convince a potential client your topic is worth pursuing and exciting, or how it is for the social good. Each student will have 5-min max to pitch. If the project is a team's work, each member will need to participate, with a max of 5-min talk time for each person. No need to use slides (you can, but not required). Time limit strictly enforced.
3. **Weekly reports:** (15%) Every week (14 total) submit a 200-word or less summary of the week's work on Blackboard for grading.
4. **Weekly standups:** (15%) We meet basically every week.
 - First, we break out into small groups of 3-4 students each, to share and discuss your work. The groupings are randomized every week, to be posted on OneNotes. In small group discussions, you can talk about what you have done, what you have learned, what are the blockers. Give each other comments and suggestions.
 - After each standup small group discussion, each group will report out to the entire class to summarize the projects in the group. The spoke-person will be randomly chosen.
 - Student will give a grade to each in their group at the end (on Blackboard). If a student is absent more than 50% of the class time, you must give that student a zero. If you do not give a grade to others, you will not receive a grade yourself.
 - Towards the end of the semester (# of days depending on the total number of students), each student will do a mock presentation. Each day should have 5-6 students presenting.
5. **Poster Session:** (20%) We are scheduling a dedicated poster session date on Dec 8th Friday, 5-8pm. Location TBA. This poster can be used for conference submission or the likes. The main goal is by creating a poster, it forces one to focus on what is the most important pieces in your work. Organize them on a relatively small canvas. It surely will help with preparing for the final presentation.

The GWU library has a CREATE digital studio department (go.gwu.edu/create). GWU community can use its service for **free**. It includes 3D-printing (150mm wide), workstations with full adobe suite and other designer software, go-pro camera for loan, a studio to create podcast or other digital content, and in our case, large-format printer up to 42-inch wide. All free of charge (with per-semester limits). You will need to make a poster of size 36"×48".

6. **Final presentation:** (20%) Each student/team will deliver an oral presentation at the end of semester. Date/time: TBA. For those who are collaborating with World Bank, there will be a presentation (less-technical-oriented) at World Bank, then another one just like any other projects here at GW. Details regarding presentations at World Bank will be given when we have them.
7. **Final Report:** (20%) A final written report to be submitted. You can incorporate feedbacks and suggestions received during the presentations. PLEASE notice that GWU has a very robust Writing Center to help any students with any kind of writing tasks. Please consider using it, and use it early, not the last few days.

UNIVERSITY POLICIES

OBSERVANCE OF RELIGIOUS HOLIDAYS

Students must notify faculty during the first week of the semester in which they are enrolled in the course, or as early as possible, but no later than three weeks prior to the absence, of their intention to be absent from class on their day(s) of religious observance. If the holiday falls within the first three weeks of class, the student must inform faculty in the first week of the semester. For details and policy, see “Religious Holidays” at provost.gwu.edu/policies-procedures-and-guidelines.

ACADEMIC INTEGRITY CODE

Academic integrity is an essential part of the educational process, and all members of the GW community take these matters very seriously. As the instructor of record for this course, my role is to provide clear expectations and uphold them in all assessments. Violations of academic integrity occur when students fail to cite research sources properly, engage in unauthorized collaboration, falsify data, and otherwise violate the Code of Academic Integrity. If you have any questions about whether or not particular academic practices or resources are permitted, you should ask me for clarification. If you are reported for an academic integrity violation, you should contact the Office of Student Rights and Responsibilities (SRR) to learn more about your rights and options in the process. Consequences can range from failure of assignment to expulsion from the university and may include a transcript notation. For more information, please refer to the SRR website (<https://studentconduct.gwu.edu/academic-integrity>), email rights@gwu.edu, or call 202-994-6757.

USE OF ELECTRONIC COURSE MATERIALS AND CLASS RECORDINGS

Students are encouraged to use electronic course materials, including recorded class sessions, for private personal use in connection with their academic program of study. Electronic course materials and recorded class sessions should not be shared or used for non-course related purposes unless express permission has been granted by the instructor. Students who impermissibly share any electronic course materials are subject to discipline under the Student Code of Conduct. Please contact the instructor if you have questions regarding what constitutes permissible or impermissible use of electronic course materials and/or recorded class sessions. Please contact Disability Support Services at disabilitysupport.gwu.edu if you have questions or need assistance in accessing electronic course materials.

ACADEMIC SUPPORT

WRITING CENTER

GW's Writing Center cultivates confident writers in the University community by facilitating collaborative, critical, and inclusive conversations at all stages of the writing process. Working alongside peer mentors, writers develop strategies to write independently in academic and public settings. Appointments can be booked online at gwu.mywconline.com.

ACADEMIC COMMONS

Academic Commons provides tutoring and other academic support resources to students in many courses. Students can schedule virtual one-on-one appointments or attend virtual drop-in sessions. Students may schedule an appointment, review the tutoring schedule, access other academic support resources, or obtain assistance at academiccommons.gwu.edu.

SUPPORT FOR STUDENTS OUTSIDE THE CLASSROOM

DISABILITY SUPPORT SERVICES (DSS) 202-994-8250

Any student who may need an accommodation based on the potential impact of a disability should contact Disability Support Services at disabilitysupport.gwu.edu to establish eligibility and to coordinate reasonable accommodations

COUNSELING AND PSYCHOLOGICAL SERVICES 202-994-5300

GW's Colonial Health Center offers counseling and psychological services, supporting mental health and personal development by collaborating directly with students to overcome challenges and difficulties that may interfere with academic, emotional, and personal success. healthcenter.gwu.edu/counseling-and-psychological-services.

SAFETY AND SECURITY

- In an emergency: call GWPD 202-994-6111 or 911
- For situation-specific actions: review the Emergency Response Handbook at: safety.gwu.edu/emergency-response-handbook
- In an active violence situation: Get Out, Hide Out, or Take Out. See go.gwu.edu/shooterprep
- Stay informed: safety.gwu.edu/stay-informed