



Department of Mathematics and Statistics

DATA*6700 Data Science Project Summer 2023

Credit weight: 0.50

Section: 01

1 INSTRUCTOR

Instructor: Ayesha Ali

Office: MACN 509

Phone: x53896

E-mail: aali@uoguelph.ca (best way to reach me)

2 AIMS & OBJECTIVES

2.1 Calendar Description

This course is a one-semester research project course for students in the Master of Data Science program. In this course, students plan, develop, and write a faculty- or industry-led research paper, as well as present on their work. The project should advance knowledge or practice in data science or a closely related area, and address a real-world problem faced by industry. The project should focus on data in the spatial and temporal dimension(s) to be approved by the course instructor.

Restrictions: Instructor consent required.

2.2 Course Description

Experiential learning is the focus of this course. In this course, students will lead a faculty- or industry-driven research project from start to finish, supervised by a faculty member. The project may take the form of an academic research project or internship with an industry partner, which focuses on an industry-specific problem that involve data collected over both space and time. Students will plan, develop, and write a report that includes background, approach, proposed solution, and discussion and insights. They will present their research in seminar format to their graders.

2.3 Learning Outcomes

Upon successful completion of this course, students will have demonstrated the ability to:

1. Integrate theoretical knowledge and skills acquired through coursework, and apply their new knowledge and tools to develop a solution to a practical data science problem in a supervised, real-world setting;
2. Independently manage and implement a research project in data science or a closely related field that addresses a substantive problem relevant to industry and deliver the project outcome along with a research paper to the interested parties;
3. Analyse and integrate ethics, regulations, and best practices in planning, developing, and implementing the research project and writing of the research paper; and
4. Develop interpersonal, and oral and written communication skills, as part of an academic research team that may include industry partners, by presenting the project to a diverse audience.

2.4 Instructor's Role and Responsibility to Students

The instructor will review the project plan and ensure that a faculty supervisor is in place to support the proposed data science project. Once approved, the faculty supervisor will mentor the student; they will provide guidance and timely feedback and evaluation to the student. Students will be expected to self-direct and evaluate throughout the research project; for example, students will independently seek out necessary sources of information and skills needed to undertake the project and will take responsibility for meeting their learning objectives. The final report and presentation will be evaluated by the faculty supervisor and another faculty, as a second grader. The course instructor will assist identifying a second grader or may serve as second grader themself.

3 TEACHING AND LEARNING ACTIVITIES

3.1 Timetable

Prior to taking this course, students will have identified a Master of Data Science University Faculty Affiliate who is willing to support their project as supervisor, write a brief project description and submit a learning contract for review and approval by the course instructor.

Students are recommended to develop a project plan and meeting schedule with their advisor(s).

3.2 Course Schedule

Week	Topic
Prior to course start	The student contacts prospective faculty supervisor for potential project placement. The student liaises with faculty supervisor and course instructor to develop a project plan and complete a learning contract.
Weeks 1-3	The student completes a formal project proposal that includes a description of the industry/research problem, potential impact, and a project timeline.
Weeks 3-8	The student undertakes self-directed learning under the mentorship of a faculty advisor and potentially an industry partner. Regular feedback is provided by the faculty supervisor. The student drafts a self-reflection assessment to identify potential problems, areas for improvement and future courses of action.
Weeks 8-12	The student undertakes self-directed learning under the mentorship of a faculty supervisor and potentially an industry partner. Regular feedback is provided by the faculty advisor. The student drafts a presentation that motivates and outlines the project, presents results and discusses insights gained. Presentations will take place in a seminar format, if scheduling permits, or in front of the graders.
Weeks 12-14	The student prepares a final written report of the project that incorporates faculty supervisor and/or industry partner feedback.

4 LEARNING RESOURCES

4.1 Course communication

Course material, news, announcements, and grades will be distributed through Courselink. Students are expected to check Courselink regularly for information and announcements.

4.2 Required Resources

Resources will depend on individual project needs.

5 ASSESSMENT

5.1 Dates and Distribution

Assessment	Due Date	Weighting	Learning Outcome(s)
Project proposal	June 5	12%	1-4
Self-reflection essay	July 7	10%	1-3
Presentation	Aug. 7 - 11	23%	1-4
Final written report	Aug. 14	40%	1-4
Quality of Research Effort	May 11 – Aug. 14	15%	

5.2 Assessment Descriptions

All assessments should be submitted to Courselink via Dropbox by the specified deadlines.

Project proposal (12%)

Due Date: Monday, June 5 at 5:00 PM.

Students should discuss their proposal ideas with their advisors prior to submission. Students are also expected to provide intellectual input into the development of the overall project. The assignment must consist of a one-page written proposal (single-spaced) that clearly defines the research or knowledge gap, states the problem, and the project approach/methodology. Also include a timeline for the semester and, if appropriate, you may also include a figure (neither included in the one-page limit). An example of a suitable figure would be a flow chart outlining your proposed analytical pipeline or project life cycle. Projects must include data manipulation, analysis, visualization, communication, and/or evaluation components. While projects need not involve geospatial data, they should involve data with both space and time components **if** the course is being taken in lieu of the capstone courses DATA*6500 and DATA*6600. The proposal is graded by (i) your advisor, and (ii) the course coordinator or a second grader approved by the course coordinator.

Self-Reflection Essay (10%) **Due Date:** Friday, July 7 at 5:00 PM.

Students will write a short (max. two pages, single-spaced) essay reflecting upon their progress, personal philosophy, lessons learned during the research and experiential learning process, strategies for addressing challenges, and future directions. Include an appendix with an updated timeline. Each student's essay is graded by the course coordinator.

Oral Presentation (23%) **Due Date:** Week of Aug. 7 - 11

Students will be required to present their project to the faculty advisor and second grader. Delivery format (in-person, virtual) will be determined and agreed upon by the student, advisor and second grader. Students should email a copy of their final presentation slides to the graders before or shortly after the presentation.

Final Project Report (40%) **Due Date:** Monday, Aug. 14 at 5:00 PM

Once the research project has been completed, students will be required to write their work up in the form of a research paper of up to 30 pages in total length (including all components and formatted with 2.0 line spacing). Students should use a journal style agreed upon by the student and the faculty advisor. The project paper should clearly explain the research or knowledge gap, state the problem, and the project approach/methodology, as well as the proposed solution, and thoughtful analysis and insights of the results. The paper must also address or discuss appropriate ethical considerations relevant to the project. This final report will be graded by the faculty advisor and the second grader (which may be the course coordinator). In the case that the student additionally has a third external (e.g. industry) advisor, the external advisor will also be invited to grade the report. Typically, an average of the 2-3 grades will be taken to generate the final report grade. If there is more than a 10% discrepancy between any pair of submitted grades, the course coordinator will work with the evaluators to resolve the difference and determine the final grade.

Quality of Research Effort (15%) **Due Date** May11 to Aug. 14

Your advisor(s) will assign a grade for the quality of research effort, including consistent weekly effort, preparation for meetings, creativity and perseverance in trouble-shooting, receiving and acting upon feedback, and professional and collegial interactions with others.

5.3 Course Grading Policies

Late Assignments will not be accepted. If you anticipate problems submitting an assessment on time, do contact the course coordinator as soon as possible to discuss your situation.

Accommodation of Religious Obligations: If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements. See the graduate calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations:

https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e2228.shtml

Passing grade: In order to pass the course, students must obtain a grade of 65% or higher on the total mark of all assessments.

6 UNIVERSITY STATEMENTS

6.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly; e-mail is the official route of communication between the University and its students.

6.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. See the Undergraduate Calendar for information on regulations and procedures for [Academic Consideration](#).

6.3 Drop Date

Courses that are one semester long must be dropped by the end of the last class day; two-semester courses must be dropped by the last day of class in the second semester. The regulations and procedures for changing graduate course registration are available in the Undergraduate Calendar. <https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/dropping-courses/>

6.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments; you may be asked to resubmit work at any time.

6.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

More information can be found on the SAS website [<https://www.uoguelph.ca/sas>]

6.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community—faculty, staff, and students—to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

[<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-misconduct/>]

6.7 Recording of Materials

Presentations that are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

6.8 Resources

The Academic Calendars [<https://www.uoguelph.ca/academics/calendars>] are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

6.9 Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g., final exam or major assignment).