

DATA*6700 - Data Science Project

Summer 2024 Course Outline

Section: 01

Credits: 1.00

Land Acknowledgement: Guelph

The University of Guelph resides on the ancestral lands of the Attawandaron people and the treaty lands and territory of the Mississaugas of the Credit. We recognize the significance of the Dish with One Spoon Covenant to this land and offer respect to our Anishinaabe, Haudenosaunee and Métis neighbours. Today, this gathering place is home to many First Nations, Inuit, and Métis peoples and acknowledging them reminds us of our important connection to this land where we work and learn.

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 science in the spatial and temporal dimension(s), to be approved by the course instructor.

Restriction(s): **Instructor consent required.**

Department(s): **Department of Mathematics and Statistics**

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 placement 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.

Lecture Schedule

There will be an initial course meeting with the Course Co-ordinator at the start of the semester to discuss course structure and assessments. Students will also present their project in-person at the end of the semester in a seminar format. The dates, times, and locations of these meetings are listed below. There are no other scheduled meeting times beyond those listed.

Prior to registering for 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 Co-ordinator. Students are required to develop a project plan and meeting schedule with their advisor(s).

Lab / Seminar Schedule

Day	Time	Location

Instructor Information

Lorna Deeth

Email: deeth@uoguelph.ca

Additional Support

Faculty Advisors must be identified for the project, prior to it being approved by the Co-ordinator, who will review the project plan to ensure it allows the student to apply prior course learnings during the project. Faculty advisors 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 project proposal and final report will be evaluated by the faculty advisor and another faculty, as a second grader. The Course Co-ordinator may assist with marking if needed, in addition to grading the final presentation.

Learning Resources

Required Resources

Resources will depend on individual project needs.

Course Resources & Communication

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

Course Learning Outcomes

Course Level 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.

Teaching and Learning Activities

Weekly Activities

Week	Topic
Prior to course start	The student contacts prospective faculty supervisor for potential project placement. Once the project is approved by the Course Co-ordinator, the student submits a Learning Contract that provides a high-level description of the project outcomes and milestones, data science techniques to be explored, and how the project team will work together. The Contract is to be signed by the Faculty Advisors and Industry Advisors (if applicable).
Weeks 1 – 3	The student completes a detailed 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 co-advisor. Regular feedback is provided. The student submits a detailed 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 advisor and potentially an industry co-advisor. Regular feedback is provided. The student submits a presentation that outlines the project impetus, 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 advisor and/or industry partner feedback.

Assessment Breakdown

Description	Weighting (%)	Due Date
Project Proposal	12%	Monday, June 3 by 5:00pm
Self-reflection Essay	10%	Monday, June 24 by 5:00pm
Oral Presentation	23%	Submission: Tuesday, August 6 by 12:00pm Presentations: Wednesday, August 7, 9:30am - 4:30pm
Final Written Report	40%	Monday, August 12 by 5:00pm
Quality of Research Effort	15%	May 13 - August 12

Assessment Details

Research Proposal

Project Proposal

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Learning Outcomes: 1 - 4

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 the timeline or figure are 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 DATA*6500. The proposal is graded by (1) your faculty advisor, and (2) the a second grader approved by the Course Co-ordinator.

Further details of the project proposal will be posted on Courselink.

Reflective Activities

Self-Reflection Essay

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Learning Outcomes: 1 - 3

Students will write a short (maximum 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 solely by the Course Co-ordinator.

Further details of the self-reflection essay will be posted on Courselink.

Presentation

Oral Presentation

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Learning Outcomes: 1 - 4

Students will be required to present their project to a panel of two judges/graders, as well as a public audience that may include their faculty and/or industry advisor(s), other members of the MDS program, or other interested parties. Students are to prepare a set of presentation slides, and plan for an in-person presentation approximately 10 - 15 minutes in length. Students are encouraged to review and receive feedback on presentation slides from their faculty and/or industry advisors prior to submitting them, particularly if there may be concerns regarding confidential data or non-disclosure agreements. Questions on the presentation material may be asked by the grading panel or members of the audience after the presentation.

Further details of the oral presentation will be posted on Courselink.

Students are expected to attend all DATA*6700 presentations.

In order to ensure smooth transitions between presenters, all presentation slides must be submitted to Courselink by 12:00pm (noon) on Tuesday, August 6.

Research Paper

Final Written Report

Learning Outcomes: 1 - 4

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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 Co-ordinator). 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 Co-ordinator will work with the evaluators to resolve the difference and determine the final grade.

Further details of the written report will be posted on Courselink.

Performance

Quality of Research Effort

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.

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Last Day to Drop Course

The final day to drop Summer 2024 courses without academic penalty is the last day of classes: August 02

After this date, a mark will be recorded, whether course work is completed or not (a zero is assigned for missed tests/assignments). This mark will show on the student's transcript and will be calculated into their average.

Course Grading Policies

Submission of Assignments

It is each student's responsibility to ensure they are submitting their assessments properly. Please read the following information carefully; failure to submit work properly may result in lost marks or a grade of 0.

1. Students must upload their project proposal and final paper to the appropriate Dropbox folder on Courselink, prior to the listed deadline. In addition, students must also email their project proposal and final report directly to their faculty advisor, second grader, and industry advisor (if applicable), before the assessment deadline. The Course Co-ordinator must be copied on these emails, to ensure assessments have been sent to the correct individuals by the prescribed deadline.
2. Students must submit their self-reflection essay and presentation slides to the appropriate Dropbox folder, prior to the listed deadline. These assessments are NOT submitted to faculty/industry advisors for grading, and instead are only submitted on Courselink.
3. Presentation slides must be submitted to Courselink by 12:00pm (noon) on Tuesday, August 6.

Late Submissions

Late submissions of course components will not be accepted without approval from the Course Co-ordinator. If you anticipate problems submitting an assessment on time, you must speak with the Course Co-ordinator prior to the assessment deadline, or as soon as possible afterwards. Failure to connect with the Course Co-ordinator regarding a late submission may result in a grade of 0 for that assessment.

Course Standard Statements

Course Policies

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

Standard Statements for Graduate Courses

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.

The Academic Misconduct Policy (<https://calendar.uoguelph.ca/graduate-calendar/general-regulations/academic-misconduct/>) is outlined in the Graduate Calendar.

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.

Use of the SAS Exam Centre requires students to make a booking at least 10 business days in advance, and no later than the first business day in November, March or July as appropriate for the semester. Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time. For students at the Guelph campus, information can be found on the SAS website. (<https://www.uoguelph.ca/sas/>)

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 Academic calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations (<https://calendar.uoguelph.ca/graduate-calendar/general-regulations/academic-accommodation-religious-obligations/>)

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.

Drop Date

Courses that are one semester long must be dropped by the end of the last day of classes; two-semester courses must be dropped by the last day of classes in the second semester. The regulations and procedures for Dropping Courses (<https://calendar.uoguelph.ca/graduate-calendar/general-regulations/registration/>) dropping courses are available in the Graduate Calendar (<https://calendar.uoguelph.ca/graduate-calendar/general-regulations/registration/>).

Email Communication

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

Health and Wellbeing

The University of Guelph provides a wide range of health and wellbeing services at the Vaccarino Centre for Student Wellness (<https://wellness.uoguelph.ca/>). If you are concerned about your mental health and not sure where to start, connect with a Student Wellness Navigator (<https://wellness.uoguelph.ca/navigation/>) who can help develop a plan to manage and support your mental health or check out our mental wellbeing resources. (<https://wellness.uoguelph.ca/shine-this-year/>) The Student Wellness team are here to help and welcome the opportunity to connect with you.

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).

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.

Resources

The Academic Calendars (<http://www.uoguelph.ca/registrar/calendars/?index>) are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

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 Graduate Calendar for information on regulations and procedures for Academic Consideration (<https://calendar.uoguelph.ca/graduate-calendar/general-regulations/grounds-academic-consideration/>).