Data Science Concepts (DS1000B) Course Outline

1 Course Information

Course Name:	Data Science Concepts
Course Number:	DS1000B
Term:	Winter 2026

List of Prerequisites

One or more of Ontario Secondary School MCV4U, MHF4U, MDM4U, Mathematics 0109A/B, Mathematics 0110A/B, Mathematics 1229A/B, or equivalent.

List of Antirequisites

Statistical Sciences 1023A/B, Statistical Sciences 2037A/B, Statistical Sciences 2857A/B, the former Statistical Sciences 1024A/B.

Lecture schedule

Section	Instructor	Days	Time	Location	Class Number
002	Marieke Mur	MWF	12:30–1:30 PM	NSC-1	4682
003	Pavel Shuldiner	MWF	2:30–3:30 PM	NSC-145	4683

Lab schedule

Section	Component	Days	Time	Location	Class Number
006	LAB	T	3:30–4:30 PM	MC-105B	4868
007	LAB	T	4:30–5:30 PM	BGSB-0153	4869
008	LAB	Th	2:30–3:30 PM	BGSB-0153	4870
009	LAB	Th	3:30–4:30 PM	BGSB-0153	4871

2 Instructor Information

Instructor	Email	Location	Office Hours
Marieke Mur	mmur@uwo.ca	Zoom	Wed 11:00-12:00
Pavel Shuldiner	pshuldin@uwo.ca	Teams	Tues 1:00-2:00

You are welcome to attend any instructor's office hours, not just those of your own section. Additional instructors and TA office hours will be posted on OWL when available.

2.1 Piazza & Communication

We will use **Piazza** for all class discussions. The system is highly catered to getting you help fast and efficiently from classmates, TAs, and instructors.

Etiquette & Guidelines

- **Public posts:** Ask questions about course content, logistics, or assignment concepts here so everyone can benefit from the answers.

- **Private posts:** Use only for personal or sensitive matters. This is **not** the platform to request academic considerations. Academic considerations should be submitted through the Student Absence Portal.

- **Searching before posting:** Check if your question has already been answered to avoid duplicates and speed up response times.

- **Assignment discussions:** Discuss general strategies, but do not post complete solutions or direct answers to assignment problems.

- **Respectful communication:** Maintain professionalism and respect in all interactions with peers and teaching staff.

- **Anonymity:** Post anonymously to classmates if desired; instructors will always see your identity.

2.2 Email

Students must use @uwo.ca email addresses. Reserve email **only** for issues of a highly personal nature that cannot be addressed through Piazza, and please include "DS1000B" in the subject line.

2.3 Scope of Technical Support

Installation, configuration and troubleshooting of software is outside the scope of support for this course. We recommend using Google Colab to avoid installation issues. For technical issues, consult the Western Technology Services Help Desk or online Python/Colab documentation.

3 Course Syllabus & Schedule

Course Description
Students will learn how to visualize and analyze continuous and categorical data using modern data science tools. Concepts of distributions, sampling, estimation, confidence intervals, experimental design, inference, and correlation will be introduced in a practical, data-driven way.

Tentative Course Schedule (Winter 2026)

Week	Chapter(s)	Topic	Lab Topics
Week 1 Jan 5–9	1.1–1.6	Visualizing data	(No lab this week)
Week 2 Jan 12–16	2.1 – 2.8	Measures of Center & Variability	Python & Google Colab
Week 3 Jan 19–23	4.1 – 4.6	Scatterplots & Correlation `A1 due Mon Jan 19`	`numpy` & `pandas`
Week 4 Jan 26–30	5.1 – 5.8	Linear Regression	Plotting (`matplotlib` and `seaborn`) and summarizing data
Week 5 Feb 2–6	6.1 – 6.3	Contingency Tables `A2 due Mon Feb 2`	Scatterplots and correlation
Week 6 Feb 9–13	12.1 – 12.7	Introduction to Probability `A3 due Fri Feb 13`	Two way tables and visualizing categorical data
Feb 14–22	**READING WEEK**	**NO CLASSES**	**NO LABS**
Week 7 Feb 23–27	13.1–13.7	Independence & Conditional Probability `Midterm Sun Mar 1`	Midterm review
Week 8 Mar 2–6	3.1 – 3.8	The Normal Distribution	Probability
Week 9 Mar 9–13	15.1–15.6	Sampling Distributions `A4 due Mon Mar 9`	Normal distribution
Week 10 Mar 16–20	16.1–16.4	Confidence intervals	Sampling Distributions & CLT
Week 11 Mar 23–27	8.1–8.7	Producing Data: Sampling	Sampling Techniques
Week 12 Mar 30–Apr 3	9.1–9.7	Producing Data: Experiments	Review
Week 13 Apr 6–9	32.1–32.4	Resampling: Permutation Tests and the Bootstrap `A5 due Mon Apr 6`	Review

4   Course Materials

Textbook: *The Basic Practice of Statistics*, 9th Ed, 2021. The e-book access code is **cttg7n**. The textbook is **not required**; all essential material is covered in lectures and OWL.

An ebook version can be purchased from the bookstore for $94. A hardcopy can be purchased from the bookstore for $153.

Technical Requirements: Python (or Google Colab) will be used for all programming and data analysis. No prior programming experience is required.

OWL: All course material will be posted to OWL. Students are responsible for checking OWL regularly.

5   Methods of Evaluation

Course Evaluation

Component	Weight	Deadline
Assignments (best 4 of 5)	15% (3.75% each)	Jan 19, Feb 2, Feb 13, Mar 9, Apr 6 (8:00 PM)
Midterm	35%	Sunday, Mar 1 2:00 PM – 4:00 PM
Final Exam	50%	Apr 12–30, scheduled by Registrar

5.1   Assignment Structure & Collaboration

Submission: All assignments are submitted via Gradescope and will be posted at least 10 days before the due date. Your highest four assignment scores will count toward your final grade.

Collaboration Policy: You may discuss assignment problems with peers at a conceptual level (e.g., clarifying what a question is asking, discussing general approaches). However, **all written work, code, and explanations must be completed and submitted individually**. Each student must produce their own original solutions.

Academic Integrity: Submitting work that is not your own (this includes work completed by AI), sharing code or solutions, or copying from others constitutes a **scholastic offence** and will be treated accordingly.

Regrade Requests Policy: Assignment regrade requests will be available for 7 days after assignments are returned and must be submitted exclusively through Gradescope. Before submitting a request, carefully review the posted solutions.

Regrade requests will be considered only when there is evidence of a grading error or oversight on the part of the grader. Requests on other grounds will **not** be considered. If it is marked according to the marking scheme, then the grade assigned is correct.

Please note that regrade requests may result in your score increasing, decreasing, or remaining unchanged.

5.2 Assignment Breakdown

The following is a tentative schedule of assignments, their due dates, and the topics they cover:

Assignment	Due Date	Coverage & Focus
A1: Introduction & Python basics	Mon, Jan 19	Course overview, Python fundamentals, Gradescope setup.
A2: Exploratory data analysis	Mon, Feb 2	Weeks 1–3: Variable types, descriptive statistics, visualizations, scatterplots.
A3: Relationships between variables	Fri, Feb 13	Weeks 3–5: Visualizing relationships with scatterplots, correlation, contingency tables, and linear regression.
A4: Probability and categorical data	Mon, Mar 9	Weeks 6–8: Probability, random variables, conditional probability, and independence.
A5: Inference and sampling	Mon, Apr 6	Weeks 9–12: Normal distribution, sampling distributions, Central Limit Theorem, survey sampling, observational studies and experimental design.

5.3 Missed Coursework Policy

Assignments: The assignment grade will be based on the highest 4 out of 5 assignment scores. Each of these 4 assignments will contribute 3.75% to the final course grade, for a total of 15%. The lowest assignment score will be automatically dropped.

Additionally, a 48-hour "no-penalty" grace period applies to all assignment deadlines. Assignments not submitted within the 48-hour grace period will receive a grade of zero.

Thanks to the dropped-assignment policy and 48-hour grace period, no documentation is required for a single missed assignment. Assignments submitted after the grace period will not be accepted, and no further academic consideration will be granted.

Midterm: A detailed midterm information sheet (including the number of questions, total marks, and exam format) will be posted on OWL by **February 14, 2026**. Please refrain from requesting midterm details before this date.

There is no make-up midterm. If you miss the midterm, you must submit formal supporting documentation; with approved documentation, the midterm weight will be shifted to the final exam (for a total exam weight of 85%).

Final Exam: If you miss the final exam, you must submit formal supporting documentation to be eligible for a makeup exam during the spring makeup period.

5.4 Labs

Labs are designed to support your learning of Python and its application to data science concepts covered in the course. They are facilitated by teaching assistants (TAs) and attendance is not

mandatory. Lab materials pertaining to Python code will be posted online.

Lab components are ungraded and do not contribute to your final course grade. However, they provide valuable hands-on experience and practice with the tools and techniques discussed in lectures. Some labs will serve as review sessions to reinforce lecture concepts and prepare you for assignments and exams.

6   Minimum Grade Requirement & Grading Scenarios

To pass this course, you must achieve a minimum **assessment grade** of 50% (i.e., receive at least 42.5% out of the 85% allocated to the midterm and final exam components). Your final course grade is calculated using the following formula:

$$\text{Assessment Grade} = \max\left(0.35 \times M + 0.50 \times E,\ 0.85 \times E\right) \times \frac{100}{85}$$

Where M is your midterm grade and E is your final exam grade.

If your assessment grade falls below 50%, your final course grade will equal your assessment grade, and assignment scores will not be included.

The following table illustrates how your midterm, final exam, and assignment scores interact under different grading scenarios:

Scenario	M	E	A	Outcome / Logic	Assessment grade	Course grade
1	45%	75%	90%	**Final > Midterm:** Final becomes 85%.	75.0%	**77.3%**
2	80%	60%	85%	**Midterm > Final:** Weights stay 35/50.	68.2%	**70.7%**
3	0%	70%	80%	**Approved Absence:** Midterm weight shifted.	70.0%	**71.5%**
4	40%	42%	75%	**Below 50% Threshold:** Assignments dropped.	42.0%	**42.0%**

Explicit Calculations:

Scenario 1: Final > Midterm
   Since the Final Exam score is higher, it is weighted at 85%.

$$\text{Course Grade} = 0.15(90) + 0.85(75) = \textbf{77.3\%}$$

Scenario 2: Midterm > Final
   Standard weights apply. First, we calculate the Assessment Grade out of 100:

$$\text{Assess} = \frac{0.35(80) + 0.50(60)}{0.85} = 68.2\%$$

Since 68.2% ≥ 50%, assignments are included:

$$\text{Course Grade} = 0.15(85) + 0.85(68.2) = \textbf{70.7\%}$$

Scenario 3: Approved Absence
   The Midterm weight automatically shifts to the Final.

$$\text{Assess} = 70\% \quad \longrightarrow \quad \text{Course Grade} = 0.15(80) + 0.85(70) = \textbf{71.5\%}$$

Scenario 4: Below Threshold
   The Assessment Grade is calculated as 42%. Because 42% < 50%, assignments are discarded.

$$\text{Course Grade} = \text{Assessment Grade} = \textbf{42.0\%}$$

7 Additional Statements

7.1 Religious Accommodation

When conflicts arise with a religious holiday that requires an absence from the University or prohibits certain activities, students should request an accommodation for their absence in writing to the course instructor and/or the Academic Advising office of their Faculty of Registration. This notice should be made as early as possible, but not later than two weeks prior to the writing of the examination (or one week prior to the writing of the test). Please visit the Diversity Calendars posted on our university's EDID website for the recognized religious holidays.

7.2 Academic Accommodation Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found on the university website.

7.3 General Academic Policies

Additional information is available on the Registrar Services website. Use of @uwo.ca email: In accordance with policy, the centrally administered e-mail account provided to students will be considered the individual's official university email address. It is the responsibility of the account holder to ensure that emails received from the University at their official university address are attended to in a timely manner.

7.4 Requests for Relief (formerly known as appeals)

Policy on Request for Relief from Academic Decision can be found here.

Procedures on Request for Relief from Academic Decision (Undergraduate) can be found here.

7.5 Scholastic Offences

Scholastic offences are taken seriously and students are directed to read the appropriate policy. Procedures on Scholastic Offences (Undergraduate) can be found here.

7.6 Use of Electronic Devices During Assessments

In courses offered by the Faculty of Science, the possession of unauthorized electronic devices during any in-person assessment (such as tests, midterms, and final examinations) is strictly prohibited. This includes, but is not limited to: mobile phones, smart watches, smart glasses, and wireless earbuds or headphones.

Unless explicitly stated otherwise in advance by the instructor, the presence of any such device at your desk, on your person, or within reach during an assessment will be treated as a scholastic offence, even if the device is not in use.

Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is your responsibility to review and comply with these expectations.

7.7   Use of Generative AI Tools

Unless otherwise stated, the use of generative AI tools (e.g., ChatGPT, Microsoft Copilot, Google Gemini, or similar platforms) is **not permitted** in the completion of any course assessments, including but not limited to: assignments, lab reports, presentations, tests, and final examinations.

Using such tools for content generation, code writing, problem solving, translation, or summarization, unless otherwise **explicitly** specified, will be treated as a **scholastic offence**.

If the use of generative AI is permitted for a particular assessment, the conditions of use will be specified by the instructor in advance. If no such permission is granted, students must assume that use is prohibited. It is your responsibility to seek clarification before using any AI tools in academic work.

7.8   Support Services

Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, requests for relief, exam conflicts, and many other academic-related matters.

Students who are in emotional/mental distress should refer to Mental Health @ Western for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence (GBSV) and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced GBSV (either recently or in the past), you will find information about support services for survivors, including emergency contacts. To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. If you have any questions regarding accommodations, you may also wish to contact Accessible Education.

Learning-skills counsellors at Learning Development and Success are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Additional student-run support services are offered by the USC.