

STAT 4700/7290 Section (A01)  
Statistical Consulting  
Winter 2024

**Time** T/TH, 1:00 p.m. – 2:15 p.m.  
**Location** 315 Buller

**Instructor** Carrie Madden (She/Her)  
322 Machray Hall  
Email: Carrie.Madden@umanitoba.ca  
Telephone: 204-474-6040

**Web Pages** UM Learn: <http://umanitoba.ca/umlearn>  
R Download (Windows): <https://muug.ca/mirror/cran/bin/windows/>  
R Download (MacOS): <https://muug.ca/mirror/cran/bin/macosx/>  
R Studio: <https://www.rstudio.com/products/rstudio/#download>

**Office Hours:** Tuesday 10:00 a.m. – 11:00 p.m.  
Wednesday 11:30 a.m. – 12:30 p.m.

## Territory Acknowledgment

The University of Manitoba campuses are located on original lands of Anishinaabeg, Cree, Oji-Cree, Dakota and Dene peoples, and on the homeland of the Métis Nation. We respect the Treaties that were made on these territories, we acknowledge the harms and mistakes of the past, and we dedicate ourselves to move forward in partnership with Indigenous communities in a spirit of reconciliation and collaboration.

## General Course Information

This is a non-traditional course to build skills of collaboratively investigation interdisciplinary research problems and communicating (in writing and orally) statistical results with laymen. We discuss the interaction between statisticians and clients (researchers, scientists, business people, etc.) and the role of statistical consultants. The overarching goal is to provide basic ideas of statistical consulting and some fundamental skills of providing effective statistical consulting service. The emphasis is on enhancing useful techniques and skills of developing comprehensive and creative approaches to real world problems involving statistical uncertainty. Critical thinking and problem solving are required. Knowledge of fundamental probability techniques and statistical methods are essentially important. Course work will involve discussing relevant issues in classes, formulating approaches to practical problems, cleaning, organizing and analyzing data, writing statistics reports, and communicating ideas and results in writing and orally.

## Course Goals and Intended Learning Outcomes

The goal is to develop and enhance some skills to succeed as a statistical consultant (doing the right things and doing things right): assessing your role, utilizing your statistics expertise, applying non-statistical skills, and communicating statistical ideas and results.

- proper judgement and problem formulation: formulate general research goals and specific statistics objectives, understand research problems, verify fundamental assumptions for their plausibility, investigate important (methodological, practical, computational and logistic) issues, determine the scope of research problems, clean, organize and analyze data, identify the challenges faced by and the role played by the statistics consultant;
- analytic and computing skills: choose the philosophic approach (Bayesian, frequentist), identify the statistical models and specific statistical methods required, determine the statistics software and packages needed, break down the research problems with gradually evolving conditions;
- comprehension and generalization: see the forest from the trees, learn by analogy, and generalize ideas and draw methods about other cases from related examples; ?
- critical thinking and right reasoning: critically appraise and compare the strengths and limitations of different methods, elaborate on the pros and cons of the statistical approaches and results, as well as their logistic limitations and practical constraints; ?
- effective (written and oral) communication and interpersonal skills: communication is the lifeblood of successful consulting, respect each other, clarify non-statistical jargons by asking appropriate questions, maintain research integrity and ethics standards, exercise good statistical practice and project management skills. Upon completing the course, we hope you become skillful in applying statistical and nonstatistical skills and are prepared to take the challenges as a potential statistical consultant.

The course is designed to include basic topics deemed crucial for problem formulation and understanding of the foundations of statistical thinking and reasoning. The concepts of statistical analysis will be stressed. The course will place an emphasis on the development of critical thinking and presentation skills.

## Course Resources

I will be drawing upon material from several sources here are a few:

- J. Spurrier. *The practice of statistics: putting the pieces together*, Duxbury Press, 1999.
- J.R. Boen and D.A. Zahn, *The human side of statistical consulting*, Research Methods Series, Lifetime Learning Publications, 1982.

- J. Derr, *Statistical consulting: a guide to effective communication*, Duxbury Thomson Learning, 2000.
- J. Cabrera and A. McDougall, *Statistical consulting*, Springer, 2002.
- D.J. Hand and B. Everitt, *The statistical consultant in action*, Cambridge University Press, 1987.
- G.J. Hahn and N. Doganaksoy, *A career in statistics - beyond the numbers*, Wiley, 2011.
- R.R. Newton and K.E. Rudestam, *Your Statistical Consultant*, (Second Edition), Sage, 2013.

### Video Series

Throughout this course I will be using the following video resources:

- Sharp, J. L., Griffith, E., and Higgs, M. D. (2021). *etting the stage: statistical collaboration videos for training the next generation of applied statisticians*, *ournal of Statistics and Data Science Education*, 29(2): 165-170.

## Evaluation

Classroom Participation (attendance & Engagement)	5%
Consulting Errors Presentation (groupwork)	15%
Critical Analysis Paper (solo)	15%
Assignments (2) (solo)	15%
Teaching Presentations (group/solo)	20%
Final Project (groupwork)	30%

the following are the minimum percentage grades required to receive each of the various letter grades: A<sup>+</sup> (90%), A (80%), B<sup>+</sup> (75%), B (70%), C<sup>+</sup> (65%), C (60%), D (50%).

## Academic Integrity

It is important that you understand what constitutes academic dishonesty and that you are familiar with the very serious consequences. The following link describes various types of academic dishonesty (including plagiarism, cheating, inappropriate collaboration and examination impersonation), and offers several resources to help students understand and avoid academic dishonesty:

<http://umanitoba.ca/student-supports/academic-supports/academic-integrity>

The Student Discipline Bylaw, which describes the potential consequences of academic dishonesty, can be found at the following link:

[http://umanitoba.ca/admin/governance/media/Student\\_Discipline\\_Bylaw\\_-\\_2018-09-01.pdf](http://umanitoba.ca/admin/governance/media/Student_Discipline_Bylaw_-_2018-09-01.pdf)

An academic integrity and student conduct tutorial can be found at the following link. For this course, it is recommended in particular that you view the parts on Tests & Exams and Inappropriate Collaboration.

[http://umanitoba.ca/student/resource/accessibility/files/AI-Student-Conduct-Tutorial/story\\_html5.html](http://umanitoba.ca/student/resource/accessibility/files/AI-Student-Conduct-Tutorial/story_html5.html)

## Voluntary Withdrawal

The voluntary withdrawal date is **March 20** (by which time you will have received your marks for the first three quizzes, the midterm test and the first two assignments). If you are unlikely to be successful in the course, or are not achieving the grade that you are aiming for, you should consider a VW from the course. Students enrolled in the course after the VW deadline will be assigned a final grade.

## Copyrighted Material

All course notes, assignments, tests, exams, practice questions and solutions are the intellectual property of your instructor or the Department of Statistics. **The reproduction, posting or distribution of these materials is strictly forbidden without their consent.** It is **illegal** to upload any course material to any website. For more information, see the University's Copyright Office website at <http://umanitoba.ca/copyright>.

## Recording of Class Lectures

Your instructor holds copyright over the course materials, presentations and lectures which form part of this course. **No audio or video recording of lectures or presentations is allowed in any format** without permission from your instructor.

## **Class Communication**

The University requires all students to activate an official University email account. Please note that all communication between you and your instructor must comply with the Electronic Communication with Students Policy. Please see

[http://umanitoba.ca/admin/governance/governing\\_documents/community/electronic\\_communication\\_with\\_students\\_policy.html](http://umanitoba.ca/admin/governance/governing_documents/community/electronic_communication_with_students_policy.html)

You are required to obtain and use your U of M email account for all communication between yourself and the university.

## **Professional Conduct**

Students in the University community can freely express their thoughts, opinions, and beliefs; however, they must observe the Respectful Work and Learning Environment Policy (<https://umanitoba.ca/about-um/respectful-work-and-learning-environment-policy>) and treat each other, staff, and faculty with respect. Students who are alleged to have breached the Respectful Work and Learning Environment Policy will be investigated and disciplined according to the Student Non-Academic Misconduct and Concerning Behaviour Procedure.

# Academic Accommodations

## Student Accessibility Services

Students who have, or think they may have, a disability (e.g., mental illness, learning, medical, hearing, injury-related, visual) are encouraged to contact Student Accessibility Services to arrange a confidential consultation. Instructors are notified by Student Accessibility Services what accommodations their registered students require, which will help the instructor determine fair, feasible and reasonable academic accommodations without compromising academic standards. This takes time and planning, so reach out at the start of term.

SAS students can write their exams and tests in spaces organized by the SAS Exam Centre; however, they must register with the SAS Exam Centre a few weeks in advance. Please be sure to do so to receive the accommodations.

Student Accessibility Services

<http://umanitoba.ca/student-supports/accessibility>

520 University Centre

204-474-7423

[Student.accessibility@umanitoba.ca](mailto:Student.accessibility@umanitoba.ca)

## Medical Notes and Other Documentation

The Self-Declaration for Brief and Temporary Absences Procedure and Policy will be effective on September 1, 2022 and therefore students will not be required to present medical or other documentation for absences due to extenuating circumstances of 72 hours or less; however, you must complete the form at the following link:

<https://umanitoba.ca/governance/sites/governance/files/2022-06/self-declaration-for-brief-and-temporary-student-absences-fillable-form-final-for-website.pdf>

You must submit the form to your instructor in lieu of any medical or other documentation. Please note that further documentation may be requested from students who claim multiple temporary absences or absences for more than 72 hours. You only need to submit this form if you miss an assessment. You do **not** need to fill out this form if you are missing a lecture or a tutorial. Note that personal vacations or work obligations are **not** considered valid excuses to miss assessments.

## Final Exams

If you have conflicting scheduled final exams, or if you miss a final exam due to illness or some other valid reason, **you must contact an academic advisor in your home faculty** (<http://umanitoba.ca/academic-advisors/>) as soon as possible to apply for a deferred exam. Deferred final exams are **not** arranged through your instructor or the department. Note that the granting of a deferred exam is not necessarily guaranteed.

## Health and Safety

The University of Manitoba is committed to maintaining a safe learning environment for all students, faculty, and staff. Should campus operations change because of health concerns related to the COVID-19 pandemic or other campus-wide emergency, it is possible that this course will move to a fully remote delivery format. Should the instructor be required to stay at home for an extended period and an alternate instructor not be available, the course may move temporarily to a remote delivery format.

### Mask Wearing

In a face-to-face environment, our commitment to safety requires students to observe all COVID guidelines set by the University (<https://umanitoba.ca/coronavirus>). While on campus and in class, you must wear masks as stipulated in current University policies, procedures, and guidelines. The University highly recommends the use of KN-95 masks; the minimum requirement is a ATSM Level 2 Medical mask. Both mask types are available at many locations on campus. Students who fail to comply are subject to disciplinary action in accordance with the Student Discipline Bylaw and the Non-Academic Misconduct and Concerning Behaviour Procedure. If you do not follow masking requirements, you will be asked to leave the learning space and may only return to the class already in progress when you have complied with this requirement. Repeated issues will result in disciplinary action as previously noted. **Students should not eat or drink during class time.**

### Illness

Remember: **STAY HOME IF YOU HAVE SYMPTOMS OR ARE ILL.** If you received a positive COVID test result, or if you have symptoms without testing, you must follow the instructions at <https://umanitoba.ca/covid-19/health-safety>. Specifically,

- You should **isolate for 5 days** after your symptoms started and until you have no fever and your other symptoms have improved over the past 24 hours.
- If you don't have symptoms and test positive, you should **isolate for 5 days** after your test date.

Recall that your participation mark consists of the best 8 of 11 tutorial grades, and only the best 3 of 4 quizzes and 3 of 4 assignments will count towards your final grade. **The purpose of this policy is that we know you may be unable to complete an assessment sometime during the term, either due to illness or some other valid reason.**

If you become ill while at the university, you should leave the classroom, lab, or workspace immediately. Once at home, complete the MB self-assessment and follow the directions that are provided. Please remain off-campus until cleared to return in accordance with self-assessment, testing results, and UM recommended isolation procedures.

Complete the COVID-19 case reporting form at <https://umanitoba.ca/covid-19/case-reporting>.

# Mental Health Support

For 24/7 mental health support, you can contact the Mobile Crisis Service at 204-940-1781.

## Student Counselling Centre

Contact SCC if you are concerned about any aspect of your mental health, including anxiety, stress, or depression, or for help with relationships or other life concerns. SCC offers crisis services as well as individual, couple, and group counselling.

*Student Counselling Centre:* <http://umanitoba.ca/student/counselling/index.html>

474 University Centre or S207 Medical Services

204-474-8592

## Student Support Case Management

Contact the Student Support Case Management team if you are concerned about yourself or another student and don't know where to turn. SSCM helps connect students with on- and off-campus resources, provides safety planning, and offers other supports, including consultation, educational workshops, and referral to the STATIS threat assessment team.

*Student Support Intake Assistant:* <http://umanitoba.ca/student/case-manager/index.html>

520 University Centre, Fort Garry Campus

204-474-7423

## University Health Service

Contact UHS for any medical concerns, including mental health problems. UHS offers a full range of medical services to students, including psychiatric consultation.

*University Health Service:* <http://umanitoba.ca/student/health/>

104 University Centre, Fort Garry Campus

204-474-8411 (Business hours or after hours/urgent calls)

## Health and Wellness

Contact the university's Health and Wellness Educator if you are interested in peer support from Healthy U or information on a broad range of health topics, including physical and mental health concerns, alcohol and substance use harms, and sexual assault.

*Health and Wellness Educator:*

<https://umanitoba.ca/student/health-wellness/welcome-about.html>

[britt.harvey@umanitoba.ca](mailto:britt.harvey@umanitoba.ca)

469 University Centre, Fort Garry Campus

204-295-9032

## Live Well @ UofM

For comprehensive information about the full range of health and wellness resources available on campus, visit the Live Well @ UofM site: <http://umanitoba.ca/student/livewell/index.html>.



## Your Rights and Responsibilities

As a student of the University of Manitoba, you have rights and responsibilities. It is important for you to know what you can expect from the University as a student and to understand what the University expects from you. Become familiar with the policies and procedures of the University and the regulations that are specific to your faculty, college or school.

The Academic Calendar (<https://umanitoba.ca/registrar/academic-calendar>) is one important source of information. View the sections of University Policies and Procedures and General Academic Regulations. While all of the information contained in these two sections is important, the following information is highlighted.

- If you have questions about your grades, talk to your instructor. There is a process for term work and final grade appeals. Note that you have the right to access your final examination scripts. See the Registrar's Office website for more information including appeal deadline dates and the appeal form: <http://umanitoba.ca/registrar/>.
- You are expected to view the General Academic Regulation section within the Academic Calendar, and specifically read the **Academic Integrity** regulations. Consult the course syllabus or ask your instructor for additional information about demonstrating academic integrity in your academic work. Visit the Academic Integrity Site for tools and support <http://umanitoba.ca/academicintegrity/>. View the **Student Academic Misconduct** procedure for more information.
- The University is committed to a respectful work and learning environment. You have the right to be treated with respect and you are expected to conduct yourself in an appropriate respectful manner.

For information on regulations that are specific to your academic program, read the section in the Academic Calendar and on the respective faculty/college/school web site <http://umanitoba.ca/faculties/>

Contact an Academic Advisor within **your** registered faculty/college or school for questions about your academic program and regulations.

Contact **Student Advocacy** if you want to know more about your rights and responsibilities as a student, have questions about policies and procedures, and/or want support in dealing with academic or discipline concerns.

<http://umanitoba.ca/student/advocacy/>

520 University Centre

204-474-7423

[student\\_advocacy@umanitoba.ca](mailto:student_advocacy@umanitoba.ca)