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Syllabus

ANSC 7500 – Methodology in Agricultural and Food
Sciences
(Winter 2022)



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COURSE DETAILS

Course Title & Number:	ANSC 7500 – Methodology in Agricultural and Food Sciences
Number of Credit Hours:	3.0
Class Times & Days of Week:	Lectures: Tuesdays/Thursday 10:00-11:15 am Labs: Fridays 9:00-11:00am
Location for classes/labs/tutorials:	WebEx or Zoom Meetings at the start of the term. Classes may move to presencial or hybrid format (location TBD), depending on public health orders and UM policies on COVID-19 (please see pertinent section below)
Pre-Requisites:	Must be enrolled in one of the following Levels: Graduate; Must be enrolled in one of the following Colleges: Faculty of Graduate Studies; Must be enrolled in one of the following Campuses: Main (Fort Garry & Bannatyne)

Instructor Contact Information

Instructor(s) Name & Preferred Form of Address:	Marcos Cordeiro
Office Location:	232 Animal Science Building
Office Hours or Availability:	Scheduled appointment by email
Office Phone No.	(204) 474-6112
Email:	Marcos.Cordeiro@umanitoba.ca All email communication must conform to the Communicating with Students university policy.
Contact:	Students are encouraged to contact the instructor in person, by phone or email during the time outlined above.

Course Description

Agricultural research typically involves the collection of numerical data from which conclusions are drawn. These datasets need to be analyzed in order to be properly interpreted. Statistics allows such interpretation through (i) data description and summarization, (ii) validation of sample representation, (iii) identification of trends against natural variability, and (iv) drawing objective conclusions from the datasets.

Through lectures, assigned readings, and applied exercises, students will develop analysis that incorporate different aspects of statistical analyses applied to agricultural research, from data summarization to hypothesis formulation testing.

The lectures and exercises in this course will make use of the open-source R programming language and environment for statistical computing and graphics (<https://www.r-project.org/about.html>), which is available free of charge. Please refer to the 'Course Technology' section below for more details on how to download and install the required software for this course.

Course Goals

Through analyses of agricultural research datasets using open-source statistical software, students will learn (i) to prepare, import and pre-process data for statistical analysis, (ii) identify appropriate statistical techniques to analyze different types of data collected through different experimental designs, (iii) to appreciate and validate the assumptions underlying different data analysis methods, and (iv) to interpret the outcome of the data analysis.

Course Learning Objectives

At the end of the course, students will be able to:

1. Pre-process and classify variables collected in agricultural research;
2. Perform exploratory data analyses (EDA) and data summarization;
3. Select and apply the appropriate statistical technique to analyze datasets from agricultural research;
4. Assess the validity of the underlying assumptions of each test;
5. Formulate and test experimental hypotheses;
6. Produce and interpret the results of statistical analyses commonly used in agricultural research.

Textbook, Readings, and Course Materials

There are no required texts for the course. However, supplementary readings may be assigned according to the statistical problem being addressed by the students. The following are a few examples of reading materials:

1. Ireland, C. R. (2010). *Experimental Statistics for Agriculture and Horticulture*. United Kingdom: CABI. ***Hard copy available through UM Libraries.
2. Gomez, K. A., Gomez, K. A., Gomez, A. A. (1984). *Statistical Procedures for Agricultural Research*. Egypt: Wiley. *** PDF available from: https://pdf.usaid.gov/pdf_docs/PNAAR208.pdf.
3. Brown, S. R., & Melamed, L. E. (1990). *Experimental design and analysis*. SAGE Publications, Inc. <https://www.doi.org/10.4135/9781412984218>. ***Available at the SAGE Research Methods Datasets through UM Libraries.
4. Ekstrom, C. T. (2011). *The R Primer*. Boca Raton, FL: CRC Press LLC. ***Digital version available through UM Libraries.

Using Copyrighted Material

Please respect copyright. For more information, see the University's Copyright Office website at <http://umanitoba.ca/copyright/> or contact um_copyright@umanitoba.ca.

Course Technology

The R programming language will be used as the primary software environment in this course. Students are encouraged to install R and R studio (i.e., an interface that automates some operations in R) in their personal computers. These pieces of software are available for both PC and Mac free of charge. Please install R first from CRAN (<https://www.r-project.org/>). Then, proceed to install R studio from their website (<https://www.rstudio.com/>; please download the free version). Different R packages will occasionally be installed from CRAN or github. Specific instructions will be given on how to the required install R packages. Note that students should have administrative rights in the computers they will be using during the lectures in order to install different software packages.

UM COVID-19 Policy

The University of Manitoba (the “UM”) 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. In that instance, you may be provided with an asynchronous option to minimize the impact the change may have on your schedule.

PPE and Mask Wearing

In a face-to-face environment, our commitment to safety requires students to observe all physical distancing (2m) and personal protective equipment (PPE) guidelines set by the University (<https://umanitoba.ca/coronavirus>)

While on campus and in class, you must wear PPE (Personal Protective Equipment) as stipulated in current [University policies, procedures, and guidelines](#). 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](#).

Medical-grade 3-ply masks are available at many locations on campus, including specific classroom locations, designated by your unit, the Elizabeth Dafoe Library (Fort Garry Campus) and the Brodie Centre main doors (Bannatyne Campus). Additional PPE, if necessary for a specific learning environment, will be provided to you by the teaching unit.

If you do not follow masking and other 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 these requirements. 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 become sick or are required to self-isolate you should notify your instructor by email so you can develop a plan to complete the course learning outcomes while you are absent.

If you have symptoms, do not come to campus or any UM facilities. Complete the [self-assessment](#) on the Manitoba Public Health site and follow the guidelines, which may include booking a COVID-19 test.

What to do if you become ill while at UM:

1. Leave the classroom, lab or workspace immediately. Continue to wear your mask while leaving the premises and/or while waiting for transportation.
2. Perform hand hygiene (soap and water or hand sanitizer) and avoid contact with others, and minimize contact with the physical environment.
3. Once at home, complete the [MB self-assessment](#) and follow the directions that are provided.
4. Inform your supervisor(s), instructor(s) or, if in residence, the appropriate individual.
5. You must remain off campus and all UM facilities until cleared to return in accordance with self-assessment, testing results, or MB Health requirements.

Recommended transportation options (in order):

1. Drive yourself home.
2. Pick-up by family or friend – remember to keep your mask on and to distance as much as possible, and where possible, open a window to improve ventilation.
3. Pickup by taxi/Uber:
 - Remain masked and perform hand hygiene before entering the vehicle.
 - Avoid touching the inside of the vehicle
 - Keep your mask on for the duration of the ride
 - Where possible, open a window to improve ventilation.
4. Winnipeg Transit buses - Winnipeg Transit has indicated that individuals that are ill **must not use Transit.**

ATTENTION STUDENTS RESIDING OUTSIDE WINNIPEG

As this is a remote learning course, all instructional activities and deadlines will be Winnipeg time (Central Time). Please make sure your calendars are adjusted to reflect any time changes. Please inform your Instructor as soon as possible if you are taking the course while residing outside of Winnipeg, specifically:

If you are in a rural Canadian area affected by poor internet connections that may impact completing assessments and exams on time

If you are in another time zone within or outside Canada, specify where you are, and if you foresee any challenges with attending classes and completing assessments and exams on time

NOTE: It is your responsibility to communicate with your instructors well in advance of tests/exams/assignment due dates, of any ongoing issues, OR immediately once an issue arises that *may* impact your ability to complete course work.

Expectations: I Expect You To

- a) Attend class on time so we start on time;
- b) Ask for help when you need assistance;

- c) Submit your own work for individual assignments and to work together in a team for group assigned projects;
- d) To act in a civil, respectful, and responsible manner toward all members of the U of M community. See [Respectful Work and Learning Environment Policy](#).

Class Communication:

Students are required to obtain and use your University of Manitoba email account for all communication between yourself and the university. All communication must comply with the Electronic Communication with Student Policy: http://umanitoba.ca/admin/governance/governing_documents/community/electronic_communication_with_students_policy.html;

Academic Integrity:

Each student in this course is expected to abide by the University of Manitoba [Academic Integrity principles](#). Always remember to reference the work of others that you have used. Also be advised that you are required to complete your assignments independently unless otherwise specified. If you are encouraged to work in a team, ensure that your project complies with the academic integrity regulations. You must do your own work during exams. Inappropriate collaborative behavior and violation of other Academic Integrity principles, will lead to the serious [disciplinary action](#). Visit the [Academic Calendar](#), [Student Advocacy](#), and [Academic Integrity](#) web pages for more information and support.

Refer to specific course requirements for academic integrity for individual and group work such as:

- I. Group projects are subject to the rules of academic dishonesty;
- II. Group members must ensure that a group project adheres to the principles of academic integrity;
- III. Students should also be made aware of any specific instructions concerning study groups and individual assignments;
- IV. The limits of collaboration on assignments should be defined as explicitly as possible; and
- V. All work should be completed independently unless otherwise specified.

Recording Class Lectures:

Cordeiro and the University of Manitoba hold 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, openly or surreptitiously, in whole or in part without permission. Course materials (both paper and digital) are for the participant's private study and research.

Student Accessibility Services:

The University of Manitoba is committed to providing an accessible academic community. [Students Accessibility Services \(SAS\)](#) offers academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

Student Accessibility Services
520 University Centre
Phone: (204) 474-7423
Email: Student_accessibility@umanitoba.ca

Expectations: You Can Expect Me To

-
- a) be available prior to and after the class time to discuss any questions or comments you may have;
 - b) provide feedback on assignments and exams.
-

CLASS SCHEDULE AND COURSE EVALUATION

This schedule is subject to change at the discretion of the instructor and/or based on the learning needs of the students but such changes are subject to [Section 2.8 of ROASS](#).

Item	Class Content & Teaching Strategies	Evaluation		
		Type of Assessment	Due Date	Value of Final Grade
Jan. 25	The scientific method/ Populations & sampling			
Jan. 27	Probability distribution	Assignment 1		3%
Feb. 01	Hypothesis testing/t-test			
Feb. 03	t-test/Power analysis	Assignment 2		3%
Feb. 08	Sum of squares/Regression			
Feb. 10	Regression	Assignment 3		3%
Feb. 15	One-way ANOVA			
Feb. 17	Mid-term 1			15%
Feb. 21-25	Winter break			
Mar. 01	MLR/ Type I, II, III SS			
Mar. 03	Multi-factorial ANOVA	Assignment 4		3%
Mar. 08	Overview Exp. designs			
Mar. 10	CRD	Assignment 5		3%
Mar. 15	A priori post hoc tests – contrasts			
Mar. 17	A priori post hoc tests – contrasts	Assignment 6		3%
Mar. 22	A posteriori post hoc tests – LSD/Tukey/Scheffe			
Mar. 24	Mid-term 2			23%
Mar. 29	RCBD			
Mar. 31	RIBD	Assignment 7		3%
Apr. 05	Latin Square design			
Apr. 07	Latin Square design	Assignment 8		3%
Apr. 12	Split plot design			
Apr. 14	Split plot design	Assignment 9		3%
Apr. 15	No lab – Good Friday			
Apr. 19	The nested design			
Apr. 21	Repeated measures designs			
TBD	Final exam			35%
				100%

Grading

Indicate your grading scale. A sample is given below that you can adjust to your course expectations.

Letter Grade	Percentage out of 100	Final Grade Point
A+	92-100	4.5
A	80-91	4.0
B+	75-79	3.5
B	70-74	3.0
C+	65-69	2.5
C	60-64	2.0
D	50-59	1.0
F	Less than 50	0

Voluntary Withdrawal

The last day to withdraw with no refund is April 25, 2022 (<https://umanitoba.ca/registrar/important-dates-deadlines#winter-term-2022>). Any student dropping the course after the deadline will be assigned a final grade. Course withdrawals will be recorded on official transcripts. Refer to the Registrar's Office web page for more information.

Referencing Style

Assignments should use the APA reference style as outlined in the text: American Psychological Association. (2009). Publication manual of the American Psychological Association (6th ed.). Washington, DC: Author.

Assignment Feedback

Feedback on assignments, outlines, drafts, and analysis will be within a reasonable amount of time following submission.

Assignment Extension and Late Submission Policy

Extensions will be granted in special cases under instructor discretion.

UNIVERSITY SUPPORT OFFICES & POLICIES

Schedule "A"

Section (a) sample re: A list of academic supports available to Students, such as the Academic Learning Centre, Libraries, and other supports as may be appropriate:

Writing and Learning Support

The Academic Learning Centre (ALC) offers services that may be helpful to you throughout your academic program. Through the ALC, you can meet with a learning specialist to discuss concerns such as time management, learning strategies, and test-taking strategies. The ALC also offers peer supported study groups called Supplemental Instruction (SI) for certain courses that students have

typically found difficult. In these study groups, students have opportunities to ask questions, compare notes, discuss content, solve practice problems, and develop new study strategies in a group-learning format.

You can also meet one-to-one with a writing tutor who can give you feedback at any stage of the writing process, whether you are just beginning to work on a written assignment or already have a draft. If you are interested in meeting with a writing tutor, reserve your appointment two to three days in advance of the time you would like to meet. Also, plan to meet with a writing tutor a few days before your paper is due so that you have time to work with the tutor's feedback.

These Academic Learning Centre services are free for U of M students. For more information, please visit the Academic Learning Centre website at: <http://umanitoba.ca/student/academiclearning/>

You can also contact the Academic Learning Centre by calling 204-480-1481 or by visiting 205 Tier Building.

University of Manitoba Libraries (UML)

As the primary contact for all research needs, your liaison librarian can play a vital role when completing academic papers and assignments. Liaisons can answer questions about managing citations, or locating appropriate resources, and will address any other concerns you may have, regarding the research process. Liaisons can be contacted by email or phone, and are also available to meet with you in-person. A complete list of liaison librarians can be found by subject: <http://bit.ly/WcEbA1> or name: <http://bit.ly/1tJ0bB4>. In addition, general library assistance is provided in person at 19 University Libraries, located on both the Fort Garry and Bannatyne campuses, as well as in many Winnipeg hospitals. For a listing of all libraries, please consult the following: <http://bit.ly/1sXe6RA>. When working remotely, students can also receive help online, via the Ask-a-Librarian chat found on the Libraries' homepage: www.umanitoba.ca/libraries.

Section (b) sample: re: A statement regarding mental health that includes referral information:

For 24/7 mental health support, 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
(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 our Health and Wellness Educator if you are interested in 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 <http://umanitoba.ca/student/health-wellness/welcome.html>

Katie.Kutryk@umanitoba.ca

469 University Centre
(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>

Section (c) sample: re: A notice with respect to copyright:

All students are required to respect copyright as per Canada's *Copyright Act*. Staff and students play a key role in the University's copyright compliance as we balance user rights for educational purposes with the rights of content creators from around the world. The Copyright Office provides copyright resources and support for all members of the University of Manitoba community. Visit <http://umanitoba.ca/copyright> for more information.

Section (d) sample: re: A statement directing the student to University and Unit policies, procedures, and supplemental information available on-line:

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](http://umanitoba.ca/student/records/academiccalendar.html) <http://umanitoba.ca/student/records/academiccalendar.html> is one important source of information. View the sections *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** regulation. 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. Policies governing behavior include the:

Respectful Work and Learning Environment

http://umanitoba.ca/admin/governance/governing_documents/community/230.html

Student Discipline

http://umanitoba.ca/admin/governance/governing_documents/students/student_discipline.html and,

Violent or Threatening Behaviour

http://umanitoba.ca/admin/governance/governing_documents/community/669.html

- If you experience **Sexual Assault** or know a member of the University community who has, it is important to know there is a policy that provides information about the supports available to those who disclose and outlines a process for reporting. The **Sexual Assault** policy may be found at:
http://umanitoba.ca/admin/governance/governing_documents/community/230.html
More information and resources can be found by reviewing the Sexual Assault site <http://umanitoba.ca/student/sexual-assault/>
- For information about rights and responsibilities regarding **Intellectual Property** view the policy http://umanitoba.ca/admin/governance/media/Intellectual_Property_Policy_-_2013_10_01.pdf

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 our faculty/college or school for questions about your academic program and regulations <http://umanitoba.ca/academic-advisors/>

Student Advocacy

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