STAT 1150 Section A01
Fall 2022

Time	11:30 am - 12:45 pm
Location	221 Wallace
CRN	16016
Instructor	Jenna G. Tichon
	321 Machray Hall
	Telephone: 204-474-8417
	Email: jenna.tichon@umanitoba.ca
	Preferred Form of Address: Dr. Tichon
	Pronouns: she/her
Office Hours:	Monday: 10:00 - 11:00 a.m.
	Tuesday: 1:30 - 2:30 p.m.
	Thursday: 10:00 - 11:00 a.m.
Web Pages	UMLearn: `http://umanitoba.ca/umlearn`
	Statistics: `http://umanitoba.ca/statistics`
	MyLab: `http://mlm.pearson.com/`
	Crowdmark: `http://www.crowdmark.com`

If the above times are not convenient for you, please email or speak to me to arrange an alternate time to meet. I am available for Zoom meetings by appointment but you must use your U of M email address. I will do my best to return all email within 24 hours. While I have listed my office phone, please avoid using it unless there is an emergency and you are aware that I am in my office.

Calendar Description

(Lab required) This course is recommended for students in mathematically rich disciplines, including Statistics, Mathematics, Actuarial Science, Computer Science, and related interdisciplinary programs. Topics to be covered include: summarizing and displaying large datasets, sampling, estimation and significance tests, probability calculations, random variables and probability distributions, introduction to regression and correlation analysis, statistical software.

Not to be held with STAT 1000, STAT 1001, STAT 2000, STAT 2001 and STAT 2220.

Prerequisite: Minimum of 70% in Pre-calculus Mathematics 40S or a grade of B or better in Mathematical Skills (MSKL 100) offered by Extended Education or equivalent.

Course Goals

By the end of the course we would like students to:

- Be able to make appropriate choices for numerical and graphical summaries for a wide variety of data sets.

- Formulate statistical hypotheses and perform the appropriate tests for common one-sample and two-sample data problems.

- Identify statistical questions in real world examples and think critically about data sources and assumptions made in studies.

- Be able to effectively communicate basic statistical ideas and concepts to non-statisticians.

- Use R to create graphical and numerical summaries as well as carry out all learned statistical tests.

STAT 1150 is designed to help prepare students for further study in statistics by giving a broad summary of important ideas in probability and inference. There is an emphasis on understanding the underlying principles behind the methods used so that the students can make judicious choices in their further studies what method should be applied. This course will introduce students to the use of statistical computing software to not only apply methods but explore the mechanics through simulations.

Textbook, Readings, and Course Materials

Required Textbook: *Statistics: 13th Edition* by James T. McClave and Terry T Sincich
ISBN-13: 9780135834435

The textbook is available as an e-text through the purchase of Statistic with MyLab which is required for the course. Paper copies of the textbook are available through the bookstore if students would like a hard copy as well. An access code to the textbook and MyLAbl is available for purchase through the University of Manitoba Bookstore.

Supplementary Readings: Occasionally I will assign supplementary readings in the form of short articles or website URLs to complement the lectures. These will be made available through the course website on UMLearn under the course content for the appropriate unit or on the class discussion forum.

Required Materials: All students will be required to purchase and bring with them to class a scientific non-programmable calculator. It will also be required for all quizzes, the midterms, and the final exam.

Using Copyrighted Material

Please be mindful and respect copyright throughout this course. All course notes, assignments, tests, exams, practice exams, and solutions are either my own intellectual property or that of the Department of Statistics. If I use any copyrighted material in my lectures I will properly source and follow copyright guidelines and I expect you to do the same. The copyrighted works are made available for your personal use and study and must not be distributed in any format without express permission.

You do not have permission to upload any course notes, tests, assignments, or handouts to any note sharing websites. Please see the following site for more information: `https://umanitoba.ca/student/resource/student_advocacy/media/Message_note_sharing_December_2013.pdf`

No video or audio recording of lectures or presentations is allowed in any format, openly or surreptitiously, in whole or in part without my permission.

Course Technology

Use of Technology in the Classroom: Please ensure that any technology used in the class is used in a responsible manner that is mindful of the students around you. You may have cell phones on your person as long as they are kept on silent and are not brought above table height. You may use laptops or tablets in class to help with note taking or follow along with any computer demonstrations but please keep only academic matters up on your screen and refrain from distracting the students around you.

R Studio: In this class we will be making use of the statistical software R. You may download R from `http://cran.utstat.utoronto.ca/` and the R Studio program from `https://www.rstudio.com/products/rstudio/download/`. R Studio will also be available from the statistics computer lab. If you require assistance installing R Studio, you may come and see me in my office hours. We will go over the basic installation and use in the first lab of the semester.

Throughout the course I will demonstrate how to carry out many of the calculations using R and the labs will make extensive use of R for doing demonstrations and simulations.

UMLearn: All course material will be posted on UMLearn in the Contents section. All important dates can be found on the calendar and I will make class announcements through the news feed on the course website. All grades will be posted in the UMLearn Gradebook

In addition, there will also be discussion forums available. For each class I will open up a discussion forum where I will post the material covered that class, any announcements, and suggestions for preparation for the next class. Please be in the habit of checking it after every class. If you have questions about anything during the lecture or any announcements, you can ask directly on the forum for the relevant class. There will also be a discussion forum opened up for each lab section where you can ask questions of your T.A. or your fellow lab

mates.

All discussion will be monitored closely by me. Please be courteous in posing questions and replying to questions on the board. Your best effort should be made to make clear questions in complete English sentences.

Crowdmark: All quizzes, the midterm, and the final exam will be marked using the Crowdmark software, an online grading tool. All exams will be written on provided paper and then scanned for grading. Additional instructions will be given prior to the first assessment to ensure the examinations can be scanned correctly. Upon completion of the quizzes and the midterm, an electronically marked copy of your exam will be emailed to your UManitoba e-mail address. I will send out an email when the marked copies have been sent. Please check your spam folders if you do not see it in your inbox.

Notice Regarding Collection, Use, and Disclosure of Personal Information by the University: Your personal information is being collected under the authority of the *University of Manitoba Act.* It will be used for the purposes of grading papers and providing feedback to students. Personal information will not be used or disclosed for other purposes, unless permitted by *The Freedom of Information and Protection of Privacy Act* (FIPPA). The University of Manitoba has taken steps to ensure that its agreement with Crowdmark, Inc. for services provided by the Crowdmark application in compliance with FIPPA. Please be aware that information held by Crowdmark Inc. may be transmitted to and stored on servers outside of the University of Manitoba, or Canada. The University of Manitoba cannot and does not guarantee protection against the possible disclosure of your data including, without limitation, against possible secret disclosres of data to a foreign authority in accordance with the laws of another jurisdiction. If you have any questions about the collection of personal information, contact the Access and Privacy Office (tel. 204-474-9462), The University of Manitoba, 233 Elizabeth Dafoe Library, Winnipeg, Manitoba, Canada, R3T 2N2.

MyLab: This class will make use of the learning management system, MyLab. To access MyLab you will need to buy an access code from the University of Manitoba bookstore. You should then go to `http://www.pearsonmylabandmastering.com` and under **Register** select **Student**. When prompted to enter your instructor's course ID, type **tichon05254** and click **Continue**. You will then need to create a Pearson account if you do not have one from another class. Use the access code purchased from the bookstore to complete the registration. From the **You're Done!** page, select **Go To My Courses** and select my class. If you are unsure if you will remain in the course, you can use a free temporary access code for the first few weeks. You can also find these instructions posted on UMLearn.

To login in the future, go to `http://www.pearsonmylabandmastering.com` or use the link in UMLearn in the Content Browser.

In MyLab you will have access to the class textbook, the online assignments which, are worth 10% of your final grade, and other videos and supplementary instructional material.

Expectations: I Expect You To

In my class I expect you to:

- Attend lectures and listen attentively.

- Participate in small group activities when asked.

- Use technology respectfully as outlined in the syllabus.

- Come prepared the class with paper, writing utensils, a scientific calculator, and any needed statistical tables.

- Arrive to your exams with writing utensils, a scientific calculator, and a ruler if appropriate.

- Do your utmost to arrive on time and be as quiet as possible should you unavoidably need to arrive late or leave early.

- Not talk to your neighbours while I am lecturing.

- Ask questions during my lecture as needed and interrupt me if I write something incorrect on the overhead.

- Be respectful of your lab T.A.s and extend to them all courtesies you would extend to me.

- Be mindful of my time outside of class and allow me sufficient time to answer emails or look in to your concerns.

- Follow all policies in the syllabus and consult it as needed.

- Come to me with any constructive feedback that would improve the running of the course.

- Not come to class when you are feeling ill.

- Look to the class folder on UMLearn and review all material if you miss class, as well as connect with a fellow classmate to get any missed notes.

Academic Dishonesty: It is important that you understand what constitutes academic dishonesty and that you are familiar with the very serious consequences. Links to resources that describe academic dishonesty (including plagiarism, cheating, inappropriate collaboration and examination impersonation, as well as typical penalties) can be found at:

http://www.umanitoba.ca/student/resource/student_advocacy/academicintegrity/
students/a-to-i-what-is-academic-integrity.html#cheating-on-exams

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http://www.umanitoba.ca/student/resource/student_advocacy/academicintegrity/
students/student-academic-misconduct-faq.html
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https://www.sci.umanitoba.ca/students/undergraduate-students/
academic-resources/academic-integrity-2/
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I expect students to hold themselves to the highest standards of academic integrity. Impersonation, cheating for hire websites, and using unauthorized materials are very serious offences. I expect you to be honest, conduct yourself with integrity, actively encourage your peers to conduct themselves with integrity, and uphold the value of what a degree from the University of Manitoba means. When you are in doubt, always consult with your instructor. My door is always open for discussions on the boundaries of what is and what is not allowed. I will also clearly state what the ground rules are for collaboration on any assignment. Asking is a sign of integrity, not a signal that you might think of cheating. Always bear in mind that what is considered a violation of academic integrity can vary from course to course (even with the same instructor) so it is always important to ask and clarify. Ignorance is not an acceptable excuse for academic misconduct.

Recording of Class Lectures

Your instructor 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 from your instructor. If you require an audio recording to help you play back and study, I require you to first ask my permission and it must only be used for your personal use. You should take care to pause and not record your classmates when we go into group discussions. While my lectures are not being recorded, I will have the previous year's bite size recordings teaching basic concepts and most questions. This will not align 100% with questions I do in class this year but will contain all of the basic coverage to help you study and get caught up should you miss class.

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

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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.

E-mail: To schedule an appointment outside of office hours or to ask a question that would not be suitable for the discussion forums (it involves your personal information or the answer would not be of interest to other students) you may email me at my university email address. Please note that if your question is answered on the course outline (which will be posted on UMLearn), or in the discussion posts, I will simply direct you to find the answer yourself. This is not because I want to be unhelpful but because I teach three different classes, for which I'm the the only instructor of record, and I have over 350 students as well as many other service commitments. Time spent answering emails with easily searchable answers is time I not able to spend productively helping everyone. The subject line of your emails should contain "STAT 1150 A01". All emails should start with an opening salutation, be written in complete English sentences and be signed with your name and student number. Please note that I will not divulge grades over email. All emails received during the work week will be replied to within 24 hours. While I will generally check my work emails over the weekend in case there is an emergency, you can expect a reply to non-urgent matters received over the weekend by Monday at noon.

Office Hours: My office hours are listed at the top of the course outline. You do not need to make an appointment and may just show up to ask any questions that you may have. This is the perfect time to ask questions about course material, your assignment, review your coursework, or receive help with R. If you can not make my scheduled office hours, please email me to make an appointment. I am also available for meetings over Zoom by prior arrangement.

Student Accessibility Services: If you are a student with a disability, please contact SAS for 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.

`http://umanitoba.ca/student/saa/accessibility/` 520 University Centre
204-474-7423
Student_accessibility@umanitoba.ca

Expectations: You Can Expect Me To

As your instructor you can expect me to:

- Treat you with respect inside and outside of the classroom.

- Arrive early to class and remain for a few minutes afterwards to answer questions.

- Come prepared to my lectures.

- Be available during my office and make my best attempt to provide sufficient notice if an office hour needs to be moved or canceled.

- Answer your questions thoughtfully and follow up if needed.

- Listen to your feedback/concerns and do my best to take reasonable requests in to account.

- Monitor the lab demonstrators and ensure quizzes are retuned in a reasonable time period.

- Set assessments that are reasonable and contain questions that match the learning objectives for the course.

- Be passionate about my subject and what I teach.

Should I be ill, I will work with my Department to find a substitute to continue teaching the class in-person. In the event a suitable instructor cannot be found, I may give the lecture synchronously or provide asynchronous content through Zoom or UMLearn for up to 5 days. An email will be sent to students? UM email and a posting will be made on UM Learn the night before class, or as soon as possible, if this is the case.

Course Schedule and Evaluation

Please see the course schedule handout for the complete class schedule, including due dates. Please note that all dates for content coverage in these schedules are approximate and subject to minor changes. I will assign some questions as videos to watch at home for questions that are repetitive and/or similar to other class examples.

Lab Expectations: This course comes with a mandatory lab component that begins during the first full week of class. The lab will be run by graduate and senior undergraduate students from the Department of Statistics with previous lab demonstrating experience.

Eights labs will contain activities and additional instruction. The material covered is testable and is not necessarily also covered during the lecture section so it is important that you attend. These labs will have a large group work component and require participation

in group discussions. I expect that you will treat your classmates and lab demonstrators respectfully and that you will contribute meaningfully and enthusiastically to the discussions. Several of these labs will have a short pre-lab activity that I expect for you to complete prior to the start of the lab. Please bring with you writing materials, any preparatory work, and a calculator. You may wish to bring with you a computer to follow along with the R code.

Three labs will be taken up by quizzes with short answer questions that require you to show your work. Please bring with you writing utensils, a ruler, and a calculator to all quiz labs. It is very important that you write your quiz in the section in which you are registered. If you write the quiz of another lab section, you will receive a grade of 0 with no exceptions. The best 2 out of 3 quizzes will be counted. If you miss a quiz due to illness, you do not need to submit anything, it will automatically be counted as your dropped quiz.

You can see the class schedule handout for the contents of the lab in any given week. Note there is no lab the week of October 17th-21st (the first midterm). Due to the National Day for Truth and Reconciliation, there is no lab on Friday, September 30th. Students in the Friday lab should endeavour to attend a different lab section that week.

Grading:

The following will compromise your course mark:

Midterms (2)	/30
Quizzes (Best 2 of 3)	/10
MyLab Assignments	/10
R Assignments (2)	/10
Participation/Reflections	/5
Final Exam	/35

All marks with the exception of the MyLab assignments will be posted on the gradebook in UMLearn. The MyLab final marks will be on the MyLab gradebook. Only the final grade, converted to be out of 10, will appear in the UMLearn gradebook after the last day of classes.

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

These are guaranteed grades and the cutoffs will not be adjusted. I round grades ending in 0.5 or higher up subject to the condition that a student has been actively participating throughout the term and has not forfeited most of their bonus/participation marks.

Midterm Info: There are two midterms for this course that will be written in class on Tuesday, October 18th and Thursday, November 17th. It will consist of a 50 minute individual test followed up by a second 20 minute group portion. For this second portion you will randomly be divided into groups of 3-5 students. Your mark on your midterm will be the better score of 100% your individual mark or weighted as 85% your individual mark plus 15% your group mark. Please allow for the class period to extend to 11:50 if the transition

time takes a bit longer. More information on the two-stage exam and pedagogical reasons for the testing will be provided in class. You may bring in one single-sided 8.5x11 sheet of paper with you into the midterm. If you submit it with your midterm and I deem that it has a mostly complete formula listing, you will receive a 5% bonus on your midterm.

If you miss the midterm due illness, you must complete the self declaration form and hand it in to your professor within 48 hours. The weight of the midterm you do write will be increased to 20% and your final exam weight will increase to 45%.

The first midterm will cover units 1-3 and the second midterm will cover units 4-5. It consists of long and short answer questions. For quizzes, the midterm test and the final examination: (i) nonprogrammable handheld calculators are permitted (graphing calculators are **not** permitted), (ii) electronic devices, such as cell phones or headphones, are prohibited, (iii) statistical tables will be provided.

Quiz Info: There will be three short quizzes over the course of the term. I will inform students of the exact material covered on each quiz at least one week in advance. Approximate coverage can be found on the lab schedule. I will let you know in advance which formulas are provided. You may not bring in a formula sheet.

Quizzes account for 15% of your final grade. Your percentage grade for quizzes will be calculated using the **best two of three quiz marks**. Note that this policy is designed to allow for students to miss one lab due to outside circumstances without requiring a sick note and is not primarily designed to increase the grade. They will be graded within one week and marks will be posted on the Gradebook. There will be no make-up quizzes.

MyLab Assignments: Most weeks by Thursday afternoon I will put a short 2-3 question (with possible multiple parts) assignment up on MyLab. They will all consist of multiple choice or short answer questions that are graded automatically by the system. These are intended to be quick, 15 minute assignments to allow you to self assess and practice easy questions from the week. You will have multiple attempts at the short answer questions and have the ability to see guided sample questions. I will have a "practice" assignment that is not for marks so that you can get used to the system. Further details on how attempts work will be given then. As these are designed to be self assessment and keep you on pace, I **highly** recommend that you complete them by the intended due dates. However, to allow flexibility, I will not be assigning late marks. It is to your own detriment if you do not keep pace. The last day to submit MyLab assignments for marks is the last day of classes.

R Assignments: You will have two assignments that will be computing assignments done in R Markdown and turned in electronically by email by 11:59 on their due date. The required files will be posted in the class portal. Information on how to complete them will be posted as a video file in UMLearn.

Participation / Reflections: Throughout the course there will be small activities that will comprise your participation marks. Some of these will be practice activities such as the Getting To Know You Survey or the R Practice Assignment. Many classes we will be doing reflections where I will ask a prompt question and you will be asked to submit a written response at the end of class (worth 2 marks each). There may also be a small in class group activity for marks. As long as you receive a minimum of 70% of the available marks, you will receive 5/5. If you receive between 50-69% of the available marks, you will receive 3/5. If you receive less than 50% of the available marks, you will receive 0/5. As there will be plenty of extra marks for practice activities and you only need to receive 70% of the total marks, as long as you are attending most classes, you should receive 5/5 without issue. The marks are nearly entirely for honest effort at completion as opposed to correctness.

Practice Questions: Through out the course I will provide extra practice problems in pdf form, provide questions in UMLearn quizzes not for marks, and suggest questions from the textbook. These are not for marks but you should complete them for the extra practice. The pdf questions in particular will be helpful as they were written by me and will reflect the way I ask questions on the quizzes and tests. You will also find additional practice problems on the MyLab portal under the study plan.

Final Exam Info: The final exam will be 3 hours in duration and scheduled by the registrar's office. You may bring one double-sided 8.5x11 sheet of paper with you as a formula sheet. The final exam will cover Units 1 – 7, with emphasis on Units 6 – 7. Should you miss the final exam or require a deferred, please contact your home faculty. I do not personally handle any deferred exam requests.

Statistics Help Centre

In room 311 Machray Hall (which contains a number of computers), graduate students and senior undergraduate students in statistics are available to help you at the following times :

Monday	9:00 a.m. – 2:30 p.m.
Tuesday	9:00 a.m. – 7:00 p.m.
Wednesday	9:00 a.m. – 5:00 p.m.
Thursday	9:00 a.m. – 5:00 p.m.
Friday	9:00 a.m. – 5:00 p.m.

Note: The help centre will be closed on holidays and during the Reading Week (February 17 -21).

Voluntary Withdrawal

The voluntary withdrawal date is **April 22** (by which time you will have received your marks for the first two quizzes, at least one midterm, any complete MyLab assignments and R Assignment 1).

ROASS Schedule A

Schedule A of the Responsibilities of Academic Staff with regards to Students (ROASS) policies of the University of Manitoba lists resources and policies for students. It is important that you familiarize yourself with these resources and policies. Schedule A will be posted on your instructor's UMLearn page in a file labeled as the syllabus appendix

Course Topics

Unit 1 – Examining Data

- obtaining data: samples, types of variables
- representative samples and data quality
- displaying data: frequency distributions, histograms
- describing data with numbers: mean, weighted mean, median, quartiles, interquartile range, range, variance and standard deviation
- five-number summary and boxplots
- the $1.5 \times$ IQR rule for suspected outliers, outlier boxplots
- resistant measures
- Introduction to R with descriptive statistics

Unit 2 – Random Variables and Probability Distributions

- randomness, the language of probability
- long term proportion
- discrete random variables and probability distributions
- continuous random variables, density curves
- uniform distribution
- statistics vs parameters
- normal distribution

Unit 3 – Sampling Distributions

- simple random samples
- sampling distribution of a sample mean
- bias and variability
- Central Limit Theorem
- sampling distributions for proportions

Unit 4 – Confidence Intervals for a Single Population Mean

- confidence intervals for σ known
- selecting samples sizes
- introduction to the t-distribution
- confidence intervals for σ unknown
- confidence intervals for $\hat{p}$

Unit 5 − Tests of Significance for Single Populations

- tests of significance for a single population mean (σ known and unknown)
- test of significance for population proportions

Unit 6 − Inference for the Means of Two Populations

- matched pairs t procedure
- inference when population variances are equal
- inference when population variances are unequal

Unit 7 − Regression

- association versus causation
- response variable, explanatory variable
- scatterplots
- correlation
- least-squares criterion, least squares regression line and r^2
- residuals, outliers, influential observations
- lurking variables
- extrapolation
- inference on β_0 and ρ
- analysis of residuals
- confidence intervals for μ_Y

Final Examination is 3 hours in duration covers material on Units 1 − 7, with emphasis on Units 6 − 7. It will be scheduled by the Student Records Office.