STAT 2000 Section A01
Basic Statistical Analysis 2
Summer 2022

Time	Monday, Tuesday, Wednesday, & Thursday 9:00am – 10:15am
Location	EITC E3 Rm: 270
CRN	1095

Instructor	Jun(Gunho) Bae
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Office Hours: 335 Machray Hall

Monday 10:30 a.m. – 12:30 p.m.
Wednesday 10:30 a.m. – 12:30 p.m.

(or by appointment, excluding university holidays)

Calendar Description

(Lab required) This course is not recommended for students in certain programs (see the description of STAT 2150). The study of estimation and hypothesis testing procedures for means and proportions in one, two and multiple sample situations, introduction to the analysis of variance; regression and correlation analysis; optional topics may include non-parametric procedures, design of experiments, probability models. Not to be held with STAT 1150, STAT 2001. Prerequisite: STAT 1000 (C), or STAT 1001 (C).

Teaching Philosophy and Goals

It is the desire of the Department of Statistics to present this course in a manner that emphasizes and illustrates the statistical analysis arising from "real-world" applications. Whenever possible, we will attempt to bring real-life examples and data into the classroom. Upon completion of this course students can proceed in many directions: to further intensive study of statistics, to one or more additional courses in statistics, to the use of statistical methods in other fields of study, or to being a consumer of statistical information in daily life. It is our objective to serve all of these diverse directions

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 skills.

Software will be used in this course to aid in the analysis of data. The computer program that has been selected for this course, Microsoft Excel, is easy to use and is available free

for use with Mac or Windows systems. The program also has many advanced statistical features that you will find useful in subsequent courses.

Evaluation

Quizzes (best 2 of 3)	30%
Midterm Test	30%
Final Examination	40%

All quizzes and exams will be done **in person**. All marks will be posted on the UM Learn gradebook.

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%).

There is an **additional requirement** for obtaining a C in the course: to obtain a grade of C or better, you must obtain **at least 50% on the final examination.**

Exam Information

The midterm test will be held **Friday July 29, 2022 from 7:00 pm – 9:00 pm (a 2hours exam) in person** and will cover Units 1 – 3 in the course outline. The final exam will be 3 hours in duration and will be scheduled by the Student Records Office. The final exam will cover Units 1 – 6, with emphasis on Units 4 – 6. Students missing the midterm test for a valid reason will be permitted to write a deferred midterm at a later date. The midterm will consist of only multiple-choice questions. The final examination will contain both multiple-choice questions and a written component, in an approximate 75:25 ratio.

There are a total of three non-cumulative quizzes(long answer) to be completed in a 50-minute time period. We will take your best 2 of 3 quizzes to count towards your final grade. Any missed quizzes will result in a grade of 0 on that quiz, if you have valid reason for missing the weight of quiz first and second quiz will be transferred to your midterm and the weight of third quizz will be transferred to your Final Exam. Quizzes will take place in your assigned lab sections.

Quizzes, the midterm and final exam in this course are **closed book**. You cannot use the course notes or access any websites, books, or any other resources while writing. For quizzes and exams, you are also permitted to use a non-programmable scientific calculator, and any statistical tables provided by your instructor.

Academic Dishonesty

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`

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`

Tutorials & Quizzes

You will attend a tutorial twice per week (beginning on Monday, July 11th). Your T.A. will go through practice questions, which will be posted in advance on UM Learn. It is recommended that you attempt the questions in advance.

During the in-person period of the course, quizzes will be written in tutorials. The material covered on each quiz is already listed in your course schedule.

There will be three quizzes throughout the term. The best 2 quizzes are worth 30% of your final grade (equal weight). There will be no make-up quizzes. If you miss any quizzes, you will receive a grade of 0 on that quiz. **(Quiz1 July 13, Quiz2 July 20, Quiz3 Aug 5)**.

Assignments

There will be no formal assignments in this course. However, numerous practice problems (with solutions) will be posted for each unit. Students are strongly encouraged to try these practice problems on a regular basis.

Software Download

If you already have an older version of Microsoft Excel on your computer, you don't need to download it again.

To download Excel, go to `http://portal.office.com`, log into your university email credentials, click on your initials in the top right corner, select View Account, then select "Office Apps" in the left panel, and then click Install Office.

The Analysis ToolPak for Excel 2016 is referenced in the Practice Questions for some units of this course. To install this add-in to Excel, please follow the instructions found at the following link: `https://support.microsoft.com/en-ca/kb/2431349`

Voluntary Withdrawal

The voluntary withdrawal date is **Aug 2** (by which time you will have received your marks for the first two quizzes and midterm test).

Copyrighted Material

All course notes, assignments, tests, exams, practice exams and solutions are the intellectual property of your instructor or the Department of Statistics. Reproduction or distribution of these materials is strictly forbidden without their consent.

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.

Use of Electronics in the Classroom

It is the general University of Manitoba policy that all technology resources are to be used in a responsible, efficient, ethical and legal manner. A student may use technology in the classroom setting only for educational purposes approved by the instructor and/or the University of Manitoba Accessibility Services.

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

`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.

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-supports/accessibility

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 UM Learn page.

Course Outline

Unit 1 – Inference for the Mean of a Single Population

- Review of principles of statistical inference: testing and estimation, confidence intervals
- Statistical decisions: Type I and Type II errors and their probabilities, power of a test
- Review of t-distribution (comparison with normal distribution), tests and confidence intervals, robustness of t-procedure

Unit 2 – Inference for the Means of Two Populations

- Matched pairs t procedures
- Inference for the equality of means in two populations when population variances are equal and when population variances are unequal, assumptions of normality and independence

Unit 3 – Inference for the Means of Two or More Populations

- Graphical comparison of distributions
- Inference for the equality of means in two or more populations: introduction to ANOVA
- The F-distribution
- Equivalence of pooled two-sample t-test and F-test

Unit 4 – Probability and Discrete Distributions

- Review of probability concepts and rules
- Conditional probability
- Random variables, probability distributions, mean and variance of a random variable
- Review of binomial distribution

Unit 5 – Analysis of Categorical Data and Goodness-of-Fit Tests

- Inference for a population proportion
- Power calculations
- Inference for comparing two population proportions
- Inference for $(r \times c)$ two-way tables: tests of independence and homogeneity of proportions, chi-square test, expected values, degrees of freedom

- Equivalence of Z-test and Chi-square test
- Goodness-of-fit tests
- Binomial goodness-of-fit test

Unit 6 – Regression and Correlation

- Inference in simple linear regression (slope, confidence intervals)
- Analysis of residuals and use of diagnostic tools
- Multiple regression (time permitting)