MATH*2310*WDE: Elementary Probability and Statistics

Winter 2022

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Lectures: TTh 08:00 – 09:30   **Lecture Room:** N/A (Zoom)
   Labs: F   14:00 – 15:00   **Lab Room:** N/A (Zoom)

Instructor: Dr. George Hutchinson   **E-mail:** ghutchi1@lakeheadu.ca
Office Hours: TBA   **Office:** N/A (Zoom)

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Course Summary

Areas of study include: Sample Spaces and events; Elementary Probability; Descriptive Statistics using Tables and Charts; Measures of Central Tendency; Variability and Association; Basic Discrete and Continuous Distributions; Hypothesis Testing and Confidence Intervals; Simple Linear Regression and Correlation.

See page 3-5 for a more detailed schedule of topics that we will be covering.

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Course Materials

Website: This course uses a D2L (Courselink) site, on which grades and important course information will be posted. You are expected to check this website regularly for announcements and course materials.
(The website can be found at www.mycourselink.lakeheadu.ca.)

Required Textbook & Supplementary Material: There is no required textbook for this course. The course notes will be the primary source of information. Students who desire supplementary material are encouraged to use the following (free!) online textbook:

https://open.umn.edu/opentextbooks/textbooks/introductory-statistics - Introductory Statistics, by Douglas Shafer and Zhiyi Zhang

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Descriptions of Course Components

Lecture: While attendance is not technically mandatory, you are strongly encouraged to come to lecture. As there is no textbook for this course, lectures will be the primary source of material, and there will often be important information regarding assignments and tests conveyed in lecture.

NOTE: *Prior to each lecture, I will upload a document consisting of partially completed notes for that class. You are expected to bring these notes to lecture, and we will fill them in together.*

Lab: While the purpose of the lectures is to introduce new material and discuss statistical theory, it is in the lab that we will apply the lecture material to solve problems. The notes from these sessions should prove invaluable to you as you work through your assignments and study for your tests and exam.

Assignments: There will be 6 assignments over the course of the semester. Only your best 5 assignments will count towards your final grade. The assignments will be released on the dates indicated on the Course Schedule (see next page). These assignments will require you to make use of the statistical software "*R*" to perform statistical analysis on a provided data set and interpret the results. *R* is a free software that can be downloaded at the following URL: https://www.r-project.org/.

NOTE: *I am dropping your lowest assignment marks to account for one missed assignment. If more than one assignment must be missed for a legitimate reason (e.g. Illness), I may allow you to submit your assignment late, or (if the assignment solutions have already been released) I may allocate the weight of the assignment to the final exam.*

Term Tests: There will be two Term Tests, written during Lecture. These are scheduled for February 08 and March 08. Test #1 will cover Weeks 1-4 and Test #2 will cover Weeks 1-8 with a strong emphasis on weeks 5-8.

NOTE: *If a term test is missed for a legitimate reason which you can document (e.g. doctor's note), the weight of the test will be added to the final exam.*

Final Exam: There will be a cumulative final exam, the date and time of which will be announced as soon as it is scheduled.

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Course Schedule:

We will adhere to the following schedule to the best of our abilities. It may be subject to minor changes due to unforeseen delays and/or expedience.

Week	Topics Covered	Evaluation
W1 Jan. 10 – Jan. 14	**The Basics:** Statistical Terminology; Sampling Procedures; Bias; Sources of Error; Descriptive Statistics vs. Inferential Statistics; Measures of Central Tendency	None
W2 Jan. 17 – Jan. 21	**The Basics:** Frequency plots; Standard Deviation and Variance; Boxplots and Outliers; Linear Transformations **Introduction to Probability:** Events; Operations on Events; Venn Diagrams	Assignment #1 released on January 18.
. **W3** Jan. 24 – Jan. 28	**Introduction to Probability:** Mutual Exclusivity; Conditional Probability; Independence; Bayes' Theorem; Discrete Probability Distributions; Expected Value and Variance of Discrete Distributions; The Binomial Distribution	Assignment #1 due on January 25. Assignment #2 released on January 27.
W4 Jan. 31 – Feb. 04	**Discrete Probability Distributions:** The Poisson Distribution; The Hypergeometric Distribution; The Geometric Distribution; Identifying and Combining Distributions	Assignment #2 due on February 03.
W5 Feb. 07 – Feb. 11	**Continuous Probability Distributions:** Definitions and Examples; The Uniform Distribution	**Term Test #1: In class Feb. 08**

W6 Feb. 14 – Feb. 18	**Continuous Probability Distributions:** The Standard Normal Distribution; Other Normal Distributions; Assessing Normality; Sampling Distributions; The Central Limit Theorem	Assignment #3 released February 17.
W7 Feb. 21 – Feb. 25	**Hypothesis Testing:** Confidence Interval Theory; Constructing Confidence Intervals using the z- and t-tables. Hypothesis Testing on μ; Type I and II Errors; p −values; The Relationship Between Hypothesis Testing and Confidence Intervals.	Assignment #3 due February 24.
W8 Feb. 28 – Mar. 04	**READING WEEK** **ENJOY THE BREAK!**	None
W9 Mar. 07 – Mar. 11	**Hypothesis Testing:** Rejection Regions; Power of a Test	**Term Test #2: In class Mar 08**
W10 Mar. 14 – Mar. 18	**Hypothesis Testing:** Hypothesis Testing for the Difference of Two Means; Pooled Variance t Test; Welch's t-test; Paired t-test; Hypothesis Testing on Proportions **F-Distribution:** ANOVA Tables and the F-Distribution. The Fisher Least Significance Difference Test	Assignment #4 released March 15.

W11 Mar. 21 – Mar. 25	**Hypothesis Testing on Variances:** Hypothesis Testing on Two Variances; Hypothesis Testing for the Ratio of Two Variances **Chi-Square Distribution:** The Chi-Square Distribution; Chi-Square Goodness of Fit Test; Chi-Square Test for Independence	Assignment #4 due March 22. Assignment #5 released March 24
W12 Mar. 28 – Apr. 01	**Simple Linear Regression:** Introduction to Simple Linear Regression; Confidence Intervals for Regression Parameters; Hypothesis Testing for Simple Linear Regression; Estimation and Prediction in Simple Linear Regression.	Assignment #5 due March 31. Assignment #6 released March 31.
W13 Apr. 04 – Apr. 08	**Simple Linear Regression:** Introduction to Multilinear Regression Review for Final Exam	Assignment #6 due April 09.

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Evaluation

Your final grade will be comprised of the following components, weighed as indicated:

25% Assignments (Best 5 out of 6)

20% Term Test 1

20% Term Test 2

35% Final Exam

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Course Learning Outcomes:

Upon successful completion of this course, the student will have demonstrated the ability to:

- Create and interpret descriptive statistical tools, such as graphical data summaries, tables, and charts.
- Calculate simple probabilities associated with discrete and continuous probability distributions.
- Properly interpret concepts from inferential statistics, including confidence intervals and hypothesis testing
- Carry out an appropriate statistical inference procedure, given a scenario.
- Understand and utilize the procedures associated with simple linear regression.
- Utilize statistical software to carry out a variety of operations associated with: Descriptive Statistics; probability; confidence intervals; hypothesis tests; and simple linear regression.

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Lakehead-Georgian Policies

Academic and Student Code of Conduct Policies:

- Academic and student policies and procedures for those enrolled in the Lakehead-Georgian programs can be found on the Lakehead-Georgian Student Portal.
- All Lakehead-Georgian programs will follow the Lakehead Regulations as list in the Lakehead University Academic Calendar (http://csdc.lakeheadu.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&loaduseredits=False).The University Regulations include but are not limited to Registration, Examinations, Reappraisals and Academic Appeals, Special Examinations, Academic Misconduct, Withdrawal, and Timely Feedback. Additional Faculty Regulations may also apply. Please review the Academic Calendar.
- The Lakehead University Student Code of Conduct - Academic Integrity (https://www.lakeheadu.ca/students/student-life/student-conduct) will apply to all Lakehead-Georgian students regardless of campus of study.
- The Lakehead University Student Code of Conduct - Appeals (https://www.lakeheadu.ca/students/student-life/student-conduct) will apply to all Lakehead-Georgian students regardless of campus of study.
- The Georgian College Student Code of Conduct (http://www.georgiancollege.ca/student-code-of-conduct/) will apply to the Lakehead-Georgian students studying at the Barrie campus. Additional campus policies of Sexual Violence Procedure and Protocol (https://www.georgiancollege.ca/about-

georgian/campus-safety-services/tab/sexual-violence), Alcohol, Drugs and Tobacco (https://www.georgiancollege.ca/about-georgian/campus-safety-services/tab/alcohol-drugs-and-tobacco), and Information Technology Acceptable Use Procedure (http://www.georgiancollege.ca/wp-content/uploads/2-117IT-acceptable-use.pdf)also apply.

- The Lakehead University Student Code of Conduct – Non-Academic (https://www.lakeheadu.ca/students/student-life/student-conduct) will apply to the Lakehead-Georgian students studying at the Orillia campus.

Plagiarism and academic dishonesty: A breach of Academic Integrity is a serious offence. The principle of Academic Integrity, particularly of doing one's own work, documenting properly (including use of quotation marks, appropriate paraphrasing and referencing/citation), collaborating appropriately, and avoiding misrepresentation, is a core principle in university study. Students should view the Student Code of Conduct -Academic Integrity (https://www.lakeheadu.ca/students/student-life/student-conduct) for a full description of academic offences, procedures when Academic Integrity breaches are suspected and sanctions for breaches of Academic Integrity.

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Student Services and Support

Student Advisors (https://georgiancollege.sharepoint.com/sites/student/Student-Services/StudentAdvisors/SitePages/Home.aspx)

- Help students build both academic and personal resilience so that they can flourish at Georgian and beyond
- Provide individual, group and web-based advising sessions
- Are housed within the academic areas
- To book an appointment with your advisor go to the **Student Portal (preferred)** or call **705-728-1968 Ext. 1307**

Library (http://library.georgiancollege.ca/main)

Customer Service
- Off campus access

Research help
- Help finding books, articles and credible sources.
- Using specialty databases.
- Creating a search strategy.

Academic Success (https://library.georgiancollege.ca/help/contact-academic-success)

Writing Centre (http://library.georgiancollege.ca/writing_centre)

- Improve your writing.
- Help with citing sources and laying out your paper.

Math Centre (http://library.georgiancollege.ca/math_centre)

- Make sense of math questions.
- Understand concepts and develop skills.

Tutors (http://library.georgiancollege.ca/tutoring)

- Further understand course content.
- Build your study practices.

Accessibility Services (https://www.georgiancollege.ca/student-life/student-services/accessibility-services/)

If you are a student experiencing a disability who may require academic accommodations and have not yet registered with Accessibility Services, please contact their office at 705-722-1523, email studentsuccess@georgiancollege.ca, or visit their offices in B110. You must be registered with Accessibility Services to access academic accommodations. Support for those students whose success at college may be affected by a disability include:

- Ongoing support from our Accessibility Advisors including arranging a confidential psychoeducational assessment where required
- Training in the use of specialized computer technology
- Classroom and test accommodations

Testing Services (http://www.georgiancollege.ca/student-life/student-services/testing/)

- Accommodated testing
- Missed/Makeup testing
- Proctoring services are also available for external and Ontario Learn exams

Counselling (http://www.georgiancollege.ca/student-life/student-services/counselling/)

- Free, confidential counselling is available to all students
- Walk in counselling is available on a daily basis Monday to Friday

Career Success (http://www.georgiancollege.ca/student-life/student-services/co-op-and-career-services/)

Career assessments and exploring options

- Job search workshops
- Labour market information
- Resume/cover letter help
- Interview practice
- Graduate employment information
  - Links to job postings and online resource

Campus Safety and Security Syllabus Addendum

Emergency Evacuation (https://www.georgiancollege.ca/about-georgian/campus-safety-services/tab/fire)

- Evacuate buildings when a fire alarm is activated or an official announcement is given. Review evacuation guidelines. (https://www.georgiancollege.ca/about-georgian/campus-safety-services/tab/fire)
- Students requiring assistance in emergency situations must inform their faculty during the first week of class.
- Familiarize yourself with all fire exit doors of classrooms and buildings you may occupy.
- Do not re-enter a building until instructions are given by the Fire Department or college personnel.

Lockdown (https://www.georgiancollege.ca/about-georgian/campus-safety-services/tab/lockdown)

- Lockdown is initiated when there is a potential or actual violent incident on campus that could result in a serious injury or threat to life.
- Students can download the new Safe@Georgian app to stay updated on Campus Safety and Security information including lockdown.
- Familiarize yourself with the College Lockdown procedure (https://www.georgiancollege.ca/wp-content/uploads/Lockdown.pdf)
- Lockdown tests occur each semester.

Resources:

- Get Out, Hide, Fight Lockdown Video (http://youtu.be/JA8cckMbVDk)
- Lockdown quick reference sheet (http://www.georgiancollege.ca/wp-content/uploads/COM-15-416_LockdownProcedure_Signage_FVR3_print.pdf)
- Lockdown Model – Get Out, Hide, Fight: Lockdown Tools and Tactics and FAQs.

Unscheduled Campus Closure (https://www.georgiancollege.ca/about-georgian/campus-safety-services/tab/campus-closures)

Resources:

- How to find out if your campus is closed (http://www.georgiancollege.ca/about-georgian/campus-safety-services/#how-to-find-out-if-your-campus-is-closed)
- Unscheduled Campus Closure Procedure (https://www.georgiancollege.ca/wp-content/uploads/2-102Unscheduled-college-closure-2018.02.10.pdf)

Timing of Closures/Notification:

Closure	Decision	Communication / Notification*	Notes
College has made the decision to close a campus or location in the morning:	6:00 a.m.	By 6:30 a.m.	If re-opening for noon or evening classes is being considered, this will be mentioned in the message
College closes a campus(s) in the morning and expects to re-open by 12:00 noon	9:30 a.m.	By 10:00 a.m.	Only affects classes beginning at 12 noon or later
Closure expected to continue past 12:00 noon	9:30 a.m.	By 10:00 a.m.	

College intends to <u>re-open for evening classes</u> which commence at 5 p.m. or later	2:30 p.m.	By 3:00 p.m.	
College intends to <u>NOT re-open for evening classes:</u>	2:30 p.m.	By 3:00 p.m.	

*Notification will be made via:
- Georgian social media (Facebook, Twitter)
- Safe@Georgian app
- Georgian website (homepage)
- Recorded message when you call into Barrie campus at 705-728-1968
- Student or employee portal
- Georgian email account
- Radio and television announcements through local and regional media

Note: We only announce the names of campuses that are closed. If your campus is not named in a closure, it's open.

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