

Instructor Information

Name: Liton Chakraborty

E-mail: lchakrab@lakeheadu.ca

Phone: (705) 330-4008 x

Office Location: Simcoe Hall, OA 3008

Office Hours: Thursdays, 2:00 PM - 3:00 PM (drop in), or by mutually agreeable appointment

NOTE: Please use your Lakehead University email account to contact your instructor. "MATH-0210-FAO" MUST appear in the subject line and the message MUST include your *full name* and *student ID number*.

Course Information

Lectures: Tuesdays & Thursdays, 11:30 AM – 01:00 PM

Class Location: OA 2010

Lab: Thursdays, 08:30 AM – 09:30 AM

Lab Location: OA 2019

Course Description

This course introduces fundamental statistical methods for handling, describing, and analyzing both quantitative and qualitative data. Topics include descriptive statistics, data collection and sampling techniques, frequency distributions and graphs, measures of dispersion and location, probability and counting rules, discrete probability distributions, normal distribution, confidence interval and sample size determination, hypothesis testing for mean, proportion and variance, analysis of variance (ANOVA), tests using contingency tables, linear regression, and correlation analysis. Multiple regression will be covered, if time permits.

Lectures and labs are equally important for success in this course and to master several statistical analytical tools. Lab exercises will emphasize practical applications using SPSS /STATA and MS Excel.

Notes:

This course is not acceptable for credit in Mathematics or Computer Science programs. Students in other programs can receive credit for only one of Mathematics 0210, 0212 and 2321.

Learning Outcomes

By the end of this course, successful students will be able to: (i) describe statistical concepts and data using tables and graphs; (ii) interpret statistical hypotheses, assumptions, equations, and test the significance of hypotheses; (iii) be accustomed with linear regression, analysis of variance; and (iv) modeling multivariate data using SPSS /STATA, and interpret the results.

Textbook (required)

- Bluman, A. (2016). *Elementary Statistics: A Brief Version with Formula Card* (7th ed.). McGraw-Hill, ISBN: 1259345289.

Additional Textbooks (optional)

- Johnson, R., & Kuby, P. (2012). *STAT2* (2nd ed.). Boston, MA: Brooks/Cole Cengage Learning.
- Newbold, P., Carlson, W., & Thorne, B. (2013). *Statistics for Business and Economics* (8th ed.). Boston: Pearson.

Course Assessment & Requirements

Assessment process is comprehensive and the weight of each component is as follows:

Component	Due Date	Weight
Attendance, Class Participation, & In-class exercise (5)	To be announced later (TBA)	10%
Midterm Exam (1)	Tuesday, Oct 17, 2017, @ 11:30AM-12:50PM	25%
Homework Assignment (2)	HW1: Thursday, Oct 5, 2017 @ 11:59PM HW2: Tuesday, Nov 14, 2017 @ 11:59PM	15%
Group Project & Presentation (1)	Presentation: Nov 23, 2017 @ 11:30AM-1:00PM Paper Submission: Nov 28, 2017 @ 11:59PM	20%
Final Exam (Comprehensive)	TBA (Dec 7 -17, 2017 inclusive)	30%
Total		100%

This grading scheme will be strictly implemented and the deadline for each component is FINAL for all registered students apart from verified illnesses, approved through Lakehead University “Certificate of Illness or Incapacitation”, can be found at:

https://www.lakeheadu.ca/sites/default/files/forms/Certificate%20of%20Illness_Incapacity.pdf

Attendance, Class Participation, & In-class exercise (10%)

- Student attendance will be regularly monitored. For active class participation, students are strongly encouraged to prepare before attending lectures by reading the materials listed in the tentative lecture schedule below. *Five* points will be allocated for active participation and class attendance.
- A maximum of *five* in-class exercises will be done through desire2learn, and will be assessed individually. In-class exercises will be weighted equally to a maximum of *five* points. The exact time for each exercise and any other relevant information will be announced in the D2L course announcement section. There will be no in-class exercises during the weeks of the midterms, fall study break, and during the last five days of classes. Please be aware about academic schedule of 2017-18 important dates, University closures, and no class schedule: <http://csdc.lakeheadu.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&cataloggroupid=25&catalogid=24&topicgroupid=19383&loaduseredits=true>.

Midterm Examination (25%)

- One midterm exam will be held during regular class period which will count for 25% of the final grade. The format of midterm exam will be a combination of multiple-choice questions, analytical questions with basic and application exercises in the form of fill-in-the-blank, short answer, and short essay questions. This exam will test students’ proficiency with the materials covered in the lectures, exercises, lab assignments, and practice problem sets.
- Midterm exam date is set and cannot be changed except university closure or official holiday.
- Midterm grades will be posted on D2L site, and exam papers will be handed out in the class.

Homework Assignment (15%)

- There will be two homework assignments throughout the term consisting of empirical exercises mostly covered in the lab sessions. Each will count for 7.5% of the final grade. Homework assignments will be posted in the Assignment folder of D2L course site in due course. Submission deadlines for the assignments are already SPECIFIED in the course assessment section. NO LATE ASSIGNMENTS WILL BE ACCEPTED, unless an arrangement has been made with the course instructor before the deadline.

- Homework assignments will require students to download data and then use of statistical software programs such as SPSS/STATA and MS Excel.
- Students are advised to submit their solutions to the respective DROPBOX folder of D2L course site either as a SINGLE PDF or word file only. *Hand written and/ printed versions (Hard copies) of any assignments will NOT be accepted and graded.* The file name for an assignment should include the student name, student ID, and the homework number as shown in the following example: “*StudentName_StudentID_HomeworkNumber*”.

Group Project & Presentation (20%)

- Students are required to choose a topic (such as ANOVA, correlation analysis, linear regression, multiple linear regression, logistic regression), and to design a lab instruction for the chosen project immediately after the fall study break (October 9-13, 2017).
- Students should discuss and conduct meetings about their project in groups at least once in two weeks over the fall term. The description of class project and the rubric of expectation of the class project will be posted in the D2L course site.
- Though students will have one lab session to design their group project related lab instruction on *October 26th (1 hour)*, more work will be required outside the class.
- Students are required to present their project work in groups on Nov 23, 2017 during regular lecture hours, and accommodate instructor as well as other group members’ feedback into their paper before final submission approximately a week later.
- The project paper needs to be submitted in the designated DROPBOX folder of D2L course site by no later than Nov 28, 2017 @ 11:59PM, either as a SINGLE PDF or word file only, following the file name such as “*MATH0210FAO_ClassProject_GroupName*”.
- Late submission policy will be the same as with the lab assignments.

Final Examination (30%)

- Final exam will be comprehensive; but it will mostly cover post first midterm materials. The final exam period for the Fall 2017 is from December 7 – 17, 2017. Students are expected to be available during this time.
- Travel plans are not acceptable grounds for granting an alternative final examination time. Please read about examination regulations and related matters in the following webpage, <https://www.lakeheadu.ca/faculty-and-staff/policies/regulations>.
- The exact date and time for the final exam for this class will be determined by the Registrar’s Office. The final exam schedule is posted in the website: http://examtime.lakeheadu.ca/ORIL/index_oril.html.
- Please note that the Registrar’s Office can only issue final grades.

Tentative Lecture and Lab Schedule

This class schedule is ambitious. Modifications and/or eliminations of certain content might be required given our limited time together. Any necessary modifications or eliminations to the course content will be communicated to you in the regular class period.

Date	Lec & Lab #	Topic	Textbook Reading
Sep 05 / 17	Lec-1	Introduction to the course, Descriptive and Inferential Statistics, Variables and Types of Data	Bluman, Ch. 1.1-1.2
Sep 07 / 17	Lec-2	Data Collection and Sampling Techniques, Experimental Design	Bluman, Ch. 1.3-1.4
Sep 07 / 17	Lab-1	<i>Introduction to SPSS /STATA and MS Excel Data Analysis</i>	
Sep 12 / 17	Lec-3	Frequency Distributions and Graphs	Bluman, Ch. 2.1-2.4
Sep 14 / 17	Lec-4	Data Description	Bluman, Ch. 3.1-3.4

Sep 14 / 17	Lab-2	<i>Descriptive Statistics and Graphs with SPSS/ STATA</i>	
Sep 19 / 17	Lec-5	Probability and Counting Rules	Bluman, Ch. 4.1-4.5
Sep 21 / 17	Lec-6	Discrete Probability Distributions	Bluman, Ch. 5.1-5.3
Sep 21 / 17	Lab-3	<i>Frequency Distribution and Determining Normality of Frequency Distribution</i>	
Sep 26 / 17	Lec-7	Normal Distribution	Bluman, Ch. 6.1-6.4
Sep 28 / 17	Lec-8	Confidence intervals and Sample size	Bluman, Ch. 7.1-7.4
Sep 28 / 17	Lab-4	<i>Constructing confidence interval for mean, variance, and proportions</i>	
Oct 03 / 17	Lec-9	Hypothesis Testing: z and t test for a mean	Bluman, Ch. 8.1-8.3
Oct 05 / 17	Lec-10	Hypothesis Testing: Z test for proportion and chi-square test for a variance or standard deviation, test of the difference between two means using Z test	Bluman, Ch. 8.4-8.6 Bluman, Ch. 9.1
Oct 05 / 17	Lab-5	<i>Hypothesis Testing using real-life data</i>	

Fall Study Break: Monday October 9, 2017 - Friday October 13, 2017

Midterm Exam: Tuesday, October 17, 2017 @ 11:30AM-12:50PM

Oct 19 / 17	Lec-11	Hypothesis Testing: Difference between two means for independent samples vs dependent samples, two proportions, two variances	Bluman, Ch. 9.2-9.5
Oct 19 / 17	Lab-6	<i>Discussion and in-class solution for Homework Assignment 1</i>	
Oct 24 / 17	Lec-12	Correlation and introduction to regression analysis	Bluman, Ch. 10.1-10.3
Oct 26 / 17	Lec-13	Simple Regression Analysis	Newbold, Ch. 11.1-11.7
Oct 26 / 17	Lab-7	<i>Correlation tests and Simple Linear Regression</i>	
Oct 31 / 17	Lec-14	Multiple Regression: Introduction, Estimation of Coefficients, Confidence Interval and Hypothesis Tests	Newbold, Ch. 12.1-12.5
Nov 02 / 17	Lec-15	Multiple Regression: Prediction, multiple regression analysis application procedures	Newbold, Ch. 12.6-12.9
Nov 02 / 17	Lab-8	<i>Multiple Regression 1</i>	
Nov 07 / 17	Lec-16	Multiple Regression Model-building Methodology, Specification Bias, Multi-collinearity, Heteroscedasticity	Newbold, Ch. 13.1, 13.4-13.6
Nov 09 / 17	Lec-17	Additional Topics in Regression: Dummy Variables and Experimental Design	Newbold, Ch. 13.2
Nov 09 / 17	Lab-9	<i>Multiple Regression 2</i>	
Nov 14 / 17	Lec-18	Logistic Regression & Summary of problems that may arise in Multiple Regression Analysis	Handout
Nov 16 / 17	Lec-19	Analysis of Categorical Data: Goodness-of-fit tests	Bluman, Ch. 11.1 Newbold, Ch. 14.1-14.2
Nov 16 / 17	Lab-10	<i>Discussion and in-class solution for Homework Assignment 2</i>	
Nov 21 / 17	Lec-20	Analysis of Categorical Data: Tests using contingency tables	Bluman, Ch. 11.2 Newbold, Ch. 14.3
Nov 23 / 17		Group Project Paper Presentation	
Nov 23 / 17	Lab-11	<i>Logistic Regression</i>	
Nov 28 / 17	Lec-21	Analysis of Variance (ANOVA) and applications of single factor ANOVA	Bluman, Ch. 11.3 Newbold, Ch. 15.2

Teaching Philosophies

As an instructor of this course, I will guide and encourage my students to learn actively by adopting a set of cooperative learning strategies. This will facilitate my students learning how to work in a group or as a team, while enhancing critical thinking skills to be used further in the life-long learning process. Total number of registered students in the course will be divided into several working groups consisting of maximum three members who will have responsibilities to engage with pre-class readings, solving in-class exercises, discussing in the lectures, completing homework assignments, reporting and presenting group works, and assessing both own and other's work.

Other Policies

Electronic Device Policy

- THE CLASSROOM IS A HANDHELD-DEVICE-FREE ZONE.
- Turn off all handheld devices and put them away for the duration of the lecture.
- Laptop computers may only be used to view lecture materials and to work on lab materials.
- Photographic devices are not permitted in class due to copyright and privacy issues.
- Audio or video recording devices are not permitted in class due to copyright and privacy issues.
- You will need a standard scientific CALCULATOR for the class. Calculators that can store formulas or any large amounts of data are not allowed during the midterm and final exams.

Academic Misconduct

A student is expected to know what constitutes academic integrity to avoid committing academic offenses and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (e.g., plagiarism, cheating and impersonation) or about "rules" for group work/collaboration should seek guidance from the course instructor, academic advisor, or the dean of associated faculty. Students are encouraged to review Section IX of the University Regulations regarding academic dishonesty: <http://navigator.lakeheadu.ca/Catalog/ViewCatalog.aspx?topicgroupid=9352>.

Appeals

Students will be evaluated with fair treatment based on the course assessment criteria. However, students may follow the procedures and guidelines set forth in the [Senate Policy Regarding Academic Appeals](#) to appeal a final course mark or an academic decision other than a final course mark. It is the responsibility of each student registered in the course to review and be familiar with the Senate Policy regarding reappraisal and academic appeals: <https://www.lakeheadu.ca/faculty-and-staff/policies/regulations/reappraisal-and-academic-appeals>.

Accommodation for Students with Disabilities

Lakehead University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all academic activities. If you think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as early as possible. For more information, please visit: <http://studentaccessibility.lakeheadu.ca/>.

