School of Business and Leadership

MATH400
Analytical Statistics

Term: Fall 2022

Number of Credits: 3

Course Outline

INSTRUCTOR: TBD
E-MAIL: TBD

COURSE DESCRIPTION

Building on MATH210, Analytical Statistics students examine advanced statistical techniques and methods, and their applications in global and northern Canadian organizations. The course emphasizes how to apply inferential statistical techniques to support managerial decisions in various functional areas of business (e.g. all levels of government, not for profits, private businesses, and research institutes). Students will partake in a final, experiential project which will incorporate many of the tools and concepts acquired in both courses. This will allow students to better understand unique northern business challenges and encourage them to work independently, as well as collaboratively, with local northern organizations.

Topics covered include analysis of variance, chi-squared tests, regression, model building, time-series analysis and forecasting, statistical process control, and decision analysis. Learning objectives for each topic are reinforced with business problems, small case studies and/or the application of statistical techniques using Microsoft Excel®.

COURSE REQUIREMENTS

Prerequisite(s): MATH210 or RRMT202 or equivalent

EQUIVALENCY OR TRANSFERABILITY

Receiving institutions determine course transferability. Find further information at:
https://www.yukonu.ca/admissions/transfer-credit

LEARNING OUTCOMES

Upon successful completion of the course, students will be able to:

1. Identify and apply business statistical tools and concepts while working with statistical problems that are found in northern Canadian business contexts (e.g. all levels of government, research organizations, not for profits, and private businesses).
2. Apply and perform analyses of variance and chi-squared statistical techniques to test for differences between populations and make inferences about populations using sets of data.

3. Analyze the relationship between interval variables using linear regression, multiple regression and correlation techniques.
4. Use tools to develop a model which predicts the value of one variable based on information derived from other variables.
5. Interpret a time series to detect patterns and forecast future values in the time series.
6. Recognize and interpret control charts and decision analyses.
7. Communicate results and conclusions of analyses for different situations and audiences.

COURSE FORMAT

Weekly breakdown of instructional hours

Each week, a new chapter will be covered asynchronously in a lecture (1.5 hours) and synchronously in a lab (1.5 hours). There will be a summarized presentation provided on Moodle each week to print and review with the option of adding your own notes for reference. To reinforce your understanding of the material, a class will be devoted to hands on application of the material covered in the asynchronous lecture using Excel, if necessary or applicable. On a specific day, the asynchronous material will be posted for review; then on a separate day, there will be a synchronous meeting to discuss a lecture recap, student contributions, lab instruction, and activities.

Delivery format

The course format is comprised of asynchronous lectures, computer laboratory synchronous meetings and assignments, self-directed homework exercises, collaborative exercises/assignments, audio/visual presentations, and case studies. Students participate in a capstone statistical project from inception, final presentation, to report. Students will partner with a northern organization that has a business challenge or opportunity to explore. Students will be expected to appropriately analyze problems and work collaboratively with their partner organization. Supplementary materials are available on the Moodle site for this course; therefore, it is imperative to check this site and your college email frequently for updates.

EVALUATION

Professionalism & Engagement	5%
Assignments	30%
Research Project	15%
Midterm Exam	20%
Final Exam	30%
Total	100%

The material covered in the classroom and lab will be cumulative; therefore, regular student engagement is essential. Parts of the midterm and final exams will be based directly on class activities and discussions.

Students are encouraged to discuss any exceptional circumstances and their progress in the course with the instructor.

Professionalism & Engagement (5%)

Part of this course involves student displaying their understanding of course material by either: discussing a new, self-defined statistics-based question with the class for feedback, discussing a current event and its significance with respect to previously covered material, or presenting material previously covered in class in such a way as to encourage a better understanding of the material.

Assignments (30%)

There are ten quizzes and ten lab assignments. Students are given one week to complete each assignment. One extra week will be given for late assignments with a ten per cent (10%) deduction, after which time, assignments will not be accepted, and solutions will be posted. If you require extra time to complete your assignment, contact me with your request before the assignment is due. All assignments should be delivered word-processed.

Research Project (15%)

A real-world situation with relevant data sets will be presented to each student to apply statistical techniques acquired in the course. The project will be presented at the end of the course with proper analyses, a report, and an oral presentation of the results.

Midterm (20%)

There will one two-hour midterm test in this course held during regular class sessions, as indicated in the accompanying syllabus.

Final Exam (30%)

There will be a three-hour final examination. Details on this examination will be provided near the end of the term. ***Must be written in person.***

COURSE WITHDRAWAL INFORMATION

Refer to the YukonU website for important dates.

TEXTBOOKS & LEARNING MATERIALS

Keller, G. (2017): Statistics for Management and Economics Eleventh Edition: Cengage Learning, 458 pp. *Access to Excel is necessary.*

ACADEMIC INTEGRITY

Students are expected to contribute toward a positive and supportive environment and are required to conduct themselves in a responsible manner. Academic misconduct includes all forms of academic dishonesty such as cheating, plagiarism, fabrication, fraud, deceit, using the work of others without their permission, aiding other students in committing academic offences, misrepresenting academic assignments prepared by others as one's own, or any other forms of academic dishonesty including falsification of any information on any Yukon University document.

Please refer to Academic Regulations & Procedures for further details about academic standing and student rights and responsibilities.

ACADEMIC ACCOMMODATION

Reasonable accommodations are available for students requiring an academic accommodation to fully participate in this class. These accommodations are available for students with a documented disability, chronic condition or any other grounds specified in section 8.0 of the Yukon University Academic Regulations (available on the Yukon University website). It is the student's responsibility to seek these accommodations by contacting the Learning Assistance Centre (LAC): LearningAssistanceCentre@yukonu.ca.

TOPIC OUTLINE

Week	Ch.	Topic or Activity
1		Course Introduction
2	11	Introduction to Hypothesis Testing
3	12	Inference About a Population
4	13	Comparing Two Populations
5	14	Analysis of Variance
		Thanksgiving
6		Midterm (Ch 11-14)
7	15	Chi-Squared Tests
8	16	Simple Linear Regression and Correlation
9	17	Multiple Regression
10	18	Model Building
11	20	Time-series Analysis and Forecasting
12	21/22	Statistical Process Control & Decision Analysis
13		Project Presentations & Final Review (Ch 11-22, no 19)