COURSE OUTLINE

MATH400
ANALYTICAL STATISTICS

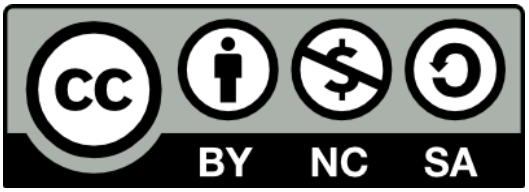
3 **CREDITS**

PREPARED BY: Lisa Kanary, Instructor
DATE: August 10, 2020

APPROVED BY: Ernie Prokopchuk, Dean
DATE: August 11, 2020

APPROVED BY SENATE: May 15, 2019
RENEWED BY SENATE: Click or tap to enter a date

APPLIED SCIENCE AND MANAGEMENT DIVISION
MATH400
ANALYTICAL STATISTICS
3 Course Credits
Fall, 2020



ANALYTICAL STATISTICS

INSTRUCTOR: Lisa Kanary
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OFFICE HOURS: Monday 1:00 - 2:00
CLASSROOM: online
TIME: W 2:30 – 3:55
DATES: Sept. 2 – Dec. 7,2020

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®.

PREREQUISITES

MATH210 or RRMT202 or equivalents, or permission of the School of Business and Leadership.

RELATED COURSE REQUIREMENTS

Access to Excel is necessary.

EQUIVALENCY OR TRANSFERABILITY

This course is a redeveloped course and because of this has not been evaluated with regards to equivalency or transferability. This process is in progress. Further information is available from the School of Business and Leadership. Students are reminded that it is always the receiving institution that determines whether a course is acceptable as an equivalent course or if it may be transferred to their program for credit.

LEARNING OUTCOMES

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

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

COURSE FORMAT

The course format is comprised of lectures, computer laboratory 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 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.

Each week, a new chapter will be covered in a lecture and a lab. There will be a summarized presentation provided on Moodle each week to print and take to class 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 previous class using Excel, if necessary or applicable. On Mondays, there will be posted mini-lectures for students to review. On Wednesdays, there will be a lecture recap, student contributions, lab discussion, and lab activities.

ASSESSMENTS:

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.

EVALUATION:

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

REQUIRED TEXTBOOKS AND MATERIAL

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

ACADEMIC AND STUDENT CONDUCT

Information on academic standing and student rights and responsibilities can be found in the current Academic Regulations that are posted on the Student Services/ Admissions & Registration web page.

PLAGIARISM

Plagiarism is a serious academic offence. Plagiarism occurs when a student submits work for credit that includes the words, ideas, or data of others, without citing the source from which the material is taken. Plagiarism can be the deliberate use of a whole piece of work, but more frequently it occurs when students fail to acknowledge and document sources from which they have taken material according to an accepted manuscript style (e.g., APA, CSE, MLA, etc.). Students may use sources which are public domain or licensed under Creative Commons; however, academic documentation standards must still be followed. Except with explicit permission of the instructor, resubmitting work which has previously received credit is also considered plagiarism. Students who plagiarize material for assignments will receive a mark of zero (F) on the assignment and may fail the course. Plagiarism may also result in dismissal from a program of study or the University.

YUKON FIRST NATIONS CORE COMPETENCY

Yukon University recognizes that a greater understanding and awareness of Yukon First Nations history, culture and journey towards self-determination will help to build positive relationships among all Yukon citizens. As a result, to graduate from ANY Yukon University program, you will be required to achieve core competency in knowledge of Yukon First Nations. For details, please see www.yukonu.ca/yfnccr.

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. If a student requires an academic accommodation, he/she should contact the Learning Assistance Centre (LAC): lac@yukonu.ca.

TOPIC OUTLINE

Week	Mon.	Wed.	Ch.	Topic or Activity	Quiz and Assignment
1		2-Sep		Course Introduction	
2	7-Sep	9-Sep	11	Introduction to Hypothesis Testing	#1
3	14-Sep	16-Sep	12	Inference About a Population	#2
4	21-Sep	23-Sep	13	Comparing Two Populations	#3
5	28-Sep	30-Sep	14	Analysis of Variance	#4
6	5-Oct	7-Oct	15	Chi-Squared Tests	#5
7	12-Oct	14-Oct		Midterm	
8	19-Oct	21-Oct	16	Simple Linear Regression and Correlation	#6
9	26-Oct	28-Oct		Project Discussion	
10	2-Nov	4-Nov	17	Multiple Regression	#7
11	9-Nov	11-Nov		Project Check-in	
12	16-Nov	18-Nov	18	Model Building	#8
13	23-Nov	25-Nov	20	Time-series Analysis and Forecasting	#9
14	30-Nov	2-Dec	21/22	Statistical Process Control & Decision Analysis	#10
15	7-Dec	8-Dec		Project Presentations & Final Review	