# NORTHWESTERN POLYTECHNIC

**DEPARTMENT OF BUSINESS AND OFFICE ADMINISTRATION**

**COURSE OUTLINE – Winter 2023**

**MG3120 (A3): Applied Statistics for Business and Economics II – 3 (3-0-1) 60 Hours for 15 Weeks**

Northwestern Polytechnic acknowledges that our campuses are located on Treaty 8 territory, the ancestral and present-day home to many diverse First Nations, Metis, and Inuit people. We are grateful to work, live and learn on the traditional territory of Duncan's First Nation, Horse Lake First Nation and Sturgeon Lake Cree Nation, who are the original caretakers of this land.

We acknowledge the history of this land and we are thankful for the opportunity to walk together in friendship, where we will encourage and promote positive change for present and future generations.

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| **INSTRUCTOR:** | Dr. Chuntai Jin | **PHONE:** | (780) 593-2857 |
| **OFFICE:** | C309 | **E-MAIL:** | cjin@nwpolytech.ca |
| **OFFICE HOURS:** | Monday & Wednesday, 10:00-11:30 AM | | |

## CALENDAR DESCRIPTION:

Statistical inference for variance; statistical inference for the means; proportions and variances from two populations; analysis of variance; non-parametric statistics; joint probability distributions; marginal and conditional distributions; covariance; correlation and independence; contingency tables; simple linear regression; multiple linear regression; nonlinear regression; and time series analysis are topics covered in the course.

## PREREQUISITE(S)/COREQUISITE:

ST1510

## REQUIRED TEXT/RESOURCE MATERIALS:

- *Business Statistics*, 4th Canadian Edition, Pearson, by Sharpe, De Veaux, Velleman, & Wright (2020) https://www.pearson.com/store/p/business-statistics-fourth-canadian-edition/P100002962598 This textbook includes *MyLab Statistics. MyLab* is a learning platform that allows students to practice course material without limit. It will also help you identify topics you still need to work on and will create a personalized study plan. Furthermore, you are required to complete a series of online assignments in *MyLab*. You need an access code to register for *MyLab Statistics* for this course.
- Software: Microsoft Excel/StatCrunch will be used to assist with the statistical calculations.
- A business/financial calculator.

## DELIVERY MODE(S):

**On-campus (face-to-face)** – This type of course will be delivered on campus in a specific location which will be indicated on the student timetable. Students are expected to fully attend in person.

## COURSE OBJECTIVES:

This course introduces students to the statistical methods of analyzing business problems. Students will learn different statistical tools that can be used to make better business decisions including displaying and describing categorical and quantitative data; confidence interval and hypothesis testing for proportions and means; probability distributions; simple linear and multiple regression analysis. Students will learn how to use Statistical software such as Excel and StatCrunch to collect data, perform complex statistical analysis, and generate reports to facilitate the analytical processes.

## LEARNING OUTCOMES:

Upon completion of this course students should be able to understand and explain:

- how to use a linear model to analyze the relationship between two variables
- probability distribution and statistical inference
- how to model discrete random variables and continuous random variables
- the sampling distribution of a proportion and a mean
- how to calculate a confidence interval and perform a hypothesis testing for a proportion
- the relationship between hypothesis tests and confidence intervals
- how to calculate a confidence interval for the difference between two proportions
- how to perform a hypothesis test comparing two proportions
- how to construct a confidence interval and perform a hypothesis testing for a mean
- how to calculate a confidence interval for the difference between two means
- how to construct confidence intervals and perform hypothesis tests on the difference between means of paired data based on the t-distribution
- how to analyze the results of a statistical experiment using ANOVA: Analysis of Variance
- how to perform a homogeneity test and a goodness-of-fit test
- which nonparametric tests can be used in given business situations, together with their advantages and disadvantages
- how to perform nonparametric tests on one, two, or more groups
- how to perform nonparametric tests to identify the degree of relationship between two variables
- how to perform a hypothesis test and calculate the confidence interval for the slope of a linear regression
- how to perform a hypothesis test on a correlation coefficient
- how to calculate the confidence interval and prediction interval for predicted values

## TRANSFERABILITY:

Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at the Alberta Transfer Guide main page http://www.transferalberta.ca.

** Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. **Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability**

## EVALUATIONS:

Assignments ................................................................................................................... 20%
Midterm Exam 1 ............................................................................................................ 20%
Midterm Exam 2 ............................................................................................................ 20%
Final Exam .................................................................................................................... 40%

## GRADING CRITERIA: (The following criteria may be changed to suite the particular course/instructor)

Please note that most universities will not accept your course for transfer credit **IF** your grade is **less than C-**.

| Alpha Grade | 4-point Equivalent | Percentage Guidelines | | Alpha Grade | 4-point Equivalent | Percentage Guidelines |
|---|---|---|---|---|---|---|
| A+ | 4.0 | 90-100 | | C+ | 2.3 | 67-69 |
| A | 4.0 | 85-89 | | C | 2.0 | 63-66 |
| A- | 3.7 | 80-84 | | C- | 1.7 | 60-62 |
| B+ | 3.3 | 77-79 | | D+ | 1.3 | 55-59 |
| B | 3.0 | 73-76 | | D | 1.0 | 50-54 |
| B- | 2.7 | 70-72 | | F | 0.0 | 00-49 |

## STUDENT RESPONSIBILITIES:

**Attendance:** Students are expected to attend all scheduled lectures, arrive on time, and remain for the duration of the activities. Arriving late and leaving early is disruptive to the entire class. Frequent tardiness may be treated as an absence. **Students with absences in excess of 6 classes may be refused permission to write the final exam**. For more information, please refer to the Academic Regulations on Debarred from Exams at https://www.gprc.ab.ca/programs/grading-systems.html

**Cell Phones:** The use of cell phones during class time is unprofessional and distracting to the instructor and fellow students. Texting and talking on a cell phone during class is therefore strictly prohibited. Cell phones must be either turned off or set to silent mode and placed out of sight.

**Email**: Email is the preferred option to communicate with your instructor. **Email correspondence to your instructor must be sent from your NWP student email account.** Emails should be professionally formatted and include a subject, correct spelling and grammar, and a reference to course material and/or textbook pages, etc. Emails that do not adhere to this format may not be responded to.

**Recording:** Photographing and/or recording course content is strictly prohibited unless advance permission is obtained from the instructor and any guest presenter(s).

## STATEMENT ON PLAGIARISM AND CHEATING:

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, refer to the Student Conduct section of the Northwestern Polytechnic Calendar at https://www.nwpolytech.ca/programs/calendar/ or the Student Rights and Responsibilities policy which can be found at https://www.nwpolytech.ca/about/administration/policies/index.html.

\*\*Note: all Academic and Administrative policies are available on the same page.

## ASSIGNMENTS, QUIZZES AND EXAMS:

Students are expected to complete all assignments before the due dates. **Late/missed assignments are NOT accepted** and **will result in a grade of zero**. All exams will be written as scheduled. **No rewrite/rescheduled exams will be given,** and **all missed exams will result in a grade of zero** unless there is an excusable absence and prior arrangements have been made with the instructor. If there is a legitimate reason of absence, the weighting of the missed midterm exam will be added to the final exam weighting. Course materials (course outline, lecture notes, connect instructions, etc.) are available on your *D2L* course space (https://myclass.gprc.ab.ca/d2l/home).

- There are 12 assignments throughout the semester. The best 10/12 accounts for 20% of the final grade with each assignment worth 2% of the final grade, regardless of the length of the assignment.
- Midterm 1 is scheduled for ***February 2nd*** and Midterm 2 is scheduled for ***March 6th.*** The final exam will be scheduled by the registrar's office during the April exam period.

## COURSE SCHEDULE/TENTATIVE TIMELINE:

| Week | Starting | Topics | Chapters |
|------|----------|--------|----------|
| 1 | Jan 4 | Data; StatCrunch | 2 |
| 2 | Jan 9 | Displaying and Describing Categorical Data | 4 |
| 3 | Jan 16 | Displaying and Describing Quantitative Data | 5 |
| 4 | Jan 23 | Scatterplots, Association, and Correlation | 6 |
| 5 | Jan 30 | Linear Regression | 7 |
| | | **Midterm Exam 1 (Thursday, February 2nd)** | **2, 4-7** |
| 6 | Feb 6 | Randomness and Probability | 8 |
| 7 | Feb 13 | Random Variables and Probability Distributions | 9 |
| **8** | **Feb 20** | *Feb 20 – 24 - Winter Break – No Classes* | |
| 9 | Feb 27 | Sampling Distributions | 10 |
| 10 | Mar 6 | **Midterm Exam 2 (Monday, March 6th)** | *8-10* |
| | | Confidence Intervals for Proportions | 11 |
| 11 | Mar 13 | Testing Hypotheses about Proportions | 12 |
| 12 | Mar 20 | Statistical Inference for Means; Comparing Two Means | 13, 14 |
| 13 | Mar 27 | Analysis of variance (ANOVA); Chi-Square Tests | 15, 16 |
| 14 | Apr 3 | Nonparametric Methods | 17 |
| 15 | Apr 10 | Multiple Regression | 20 |