MGT-203B – Intermediate Statistics for Managers

PREREQUISITE: MGB/P/T 403A – Data Analysis for Managers

TERM: Winter Quarter 2025

LECTURES: Wednesdays, 1:30 pm – 4:30 pm

INSTRUCTOR: Mehul Rangwala
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OFFICE HOURS: Will be available on the Canvas site.

TEXTBOOK: *Statistics for Management and Economics, 12th edition* by Gerald Keller, Cengage Learning.
12th edition (ebook) ISBN-13: 9780357714409, ISBN-10: 0357714407

NOTES AND HANDOUTS: I will upload the notes, data sets, and in-class exercises on Canvas before every class.

COMPUTER PACKAGES: Minitab Statistical Software. You can rent Minitab Statistical Software from http://www.onthehub.com/minitab/. Please do not rent Minitab Workspace.
No prior experience with Minitab Statistical Software is required. You will learn it through homework assignments. It is a quite intuitive and easy to use. No programming is needed.

PEDAGOGICAL APPROACH: The class sessions will be interactive with lectures, discussions, and hands-on exercises using Minitab. After I introduce a topic, we will work on cases and exercises related to the concepts covered in each class session to reinforce the theory. A laptop with Excel and Minitab installed is required.

GRADING:		
	Homework (**Group**)	20%
	Data Cases (**Group**)	30%
	Midterm (**take-home**)	25%
	Final Exam (**in-class/take-home TBD**)	25%

Course Objectives:

1. Build a foundation for big data and analytics.

2. Prepare you for other analytics-related courses in the MBA program.

3. Gain an appreciation for the breadth of statistical topics available to solve complex business problems.

4. Learn to identify correct statistical methods appropriate for business problems under consideration. Interpret the results and convey the interpretations in a non-technical manner to your audience.

5. Learn to use statistical software (Minitab) for computations.

6. Be able to critically evaluate reports/articles/research containing statistical information.

7. Communicate the insights and recommendations of statistical findings to business stakeholders using written reports.

Additional Points and Suggestions:

1. The course 403A takes you from fundamental principles through basics of regression analysis. This course (203B) closes the loop by covering ANOVA, regression analysis, time-series analysis, and statistical process control. I will spend some time during the first lecture reviewing some key concepts from the 403A so that we smoothly transition to 203B.

2. While there will be some focus on mathematical formulas, a significant proportion of time will be spent on intuition behind statistical techniques, analyzing when a particular technique should be used, and interpreting/understanding the results from the computer outputs. It is not uncommon for business managers to misapply statistical techniques to research problems. So, it is very important to be able to identify and choose correct methods to solve research problem under study.

3. After the class, re-read the class notes. Summarize what you have learned every week.

4. If you have difficulty with any material, please don't hesitate to contact me. My topmost priority is to ensure that you are successful in understanding of the material.

5. The formats of the midterm and final exams may vary but they will be open-book, open-notes. Please note that the purpose of the exams is to test your understanding of the concepts and not to test your ability to mechanically select menus and options in Minitab and Excel. To this end, the exam may contain a mix of conceptual (multiple-choice) questions and problem applications.

6. Real learning has happened when you can explain the statistical concepts in your own words to people who don't understand statistics.

7. The group homework, midterm, and the final will be cases drawn from various business situations. You will be required to perform quantitative and qualitative analyses for these cases.

8. The data cases will be based on big data and will require you to work as a group and perform simple and multiple regression analysis, build models, predict, and write a report to convey your findings to stakeholders.

Schedule on the next page

Schedule (Tentative)

This is a tentative schedule. Contents and sequence may be adjusted according to the pace of the class.

	Date	Assignments Due	Topics Covered
1	1/8/2025		Review from 403A • Overview of Inferential Statistics • Inference about Population Mean – Standard deviation known • Inference about Population Mean – Standard Deviation unknown Analysis of Variance • One-Way Analysis of Variance • Multiple Comparisons
2	1/15/2025	Homework 1	Analysis of Variance (contd.) • Randomized Block Design • Two-Factor Analysis of Variance Nonparametric Tests • Wilcoxon-Rank Sum Test • Kruskal-Wallis Test • Friedman Test
3	1/22/2025	Homework 2	Simple Linear Regression and Correlation • Introduction • Estimating and Interpreting Coefficients • Assessing the Model • Point and Interval Predictions • Non-Standard Case • Comprehensive Example
4	1/29/2025	Homework 3	Multiple Regression • Introduction • Estimating and interpreting coefficients • Assessing Model Fit • Regression Diagnostics
5	2/5/2025	**Midterm Exam (take-home)**	Model Building • Partial F-test • Polynomial regression and nonlinear regression models • Regression models with interaction • Dummy variables

	Date	Assignments Due	Topics Covered
6	2/12/2025		Model Building • Introduction to Variable Selection • Variable Selection (Stepwise Regression) • Model Building Process
7	2/19/2025	Data Case 1	Chi-Squared Tests • Chi-Squared Goodness-Of-Fit Test • Chi-Squared Test of a Contingency Table Nonparametric Statistics • Spearman Rank Correlation
8	2/26/2025		Time-Series Analysis and Forecasting • What is Time Series? • Forecasting and Methods • Time Series Components • Forecast Accuracy Measures • Naïve Forecasts • Smoothing Techniques
9	3/5/2025	Data Case 2	Time-Series Analysis and Forecasting • Trend and Seasonal Effects • Randomness and Random Walk Model • Autoregressive Modeling • Modeling Seasonal Patterns
10	3/12/2025	Homework 4	Introduction to Data Mining • What is data mining? • Data mining process • Performance of data mining models • Supervised versus Unsupervised data mining • Techniques
11	**3/19/2025**	**Final Exam (In-class or Take-Home TBD)**	**Comprehensive**