MGB-203B – Intermediate Statistics for Managers (formerly, Forecasting and Managerial Research Methods)

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

TERM: Spring Quarter 2023

LECTURES: Sundays – 4/9, 4/23, 5/7, 5/14 (the only one consecutive Sunday), and 6/4.
Midterm Exam – Take-home due on 5/14
Final Exam – In-class or take-home (TBD) on 6/11

INSTRUCTOR: Mehul Rangwala
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OFFICE HOURS: Will be available on the Canvas site.
I will stay back after every class if you want to meet me in person.

TEXTBOOK: *Statistics for Management and Economics, 12th edition* by Gerald Keller, Cengage Learning.
11th edition ISBN-13: 9781337296946, ISBN-10: 1337296945
12th edition (ebook) ISBN-13: 9780357714409, ISBN-10: 0357714407

NOTES AND HANDOUTS: I will upload the notes and the solved example data sets on Canvas before every class.

Throughout the quarter I will be posting detailed notes and solved examples on the topics covered in the class. In the past, students have found them very helpful when working on the exams and homework.

COMPUTER PACKAGE: Minitab. You can rent Minitab from
http://www.onthehub.com/minitab/
No prior experience with Minitab 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 demonstration of solved examples using Minitab.

GRADING:	Homework (**Group**)	60%
	Midterm (**take-home**)	20%
	Final Exam (**in-class or take-home TBD**)	20%

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.

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. To that 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. **All homework and the midterm exam (not the final exam) need to be submitted in printed form on the day it is due. You can submit it anytime – in the morning, afternoon, or after the class. But it needs to be submitted in printed form on the day it is due. Final exam can be submitted online, and I will print them at the GSM to grade.**

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	4/9/2023 (AM Session)		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	4/9/2023 (PM Session)		Analysis of Variance (contd.) • Randomized Block Design • Two-Factor Analysis of Variance Nonparametric Tests • Wilcoxon-Rank Sum Test • Kruskal-Wallis Test • Friedman Test
3	4/23/2023 (AM Session)	Homework 1 (Group)	Simple Linear Regression and Correlation • Introduction • Estimating and Interpreting Coefficients • Assessing the Model • Point and Interval Predictions • Non-Standard Case • Comprehensive Example
4	4/23/2023 (PM Session)		Multiple Regression • Introduction • Estimating and interpreting coefficients • Assessing Model Fit • Regression Diagnostics
5	5/7/2023 (AM Session)	Homework 2 (Group)	Model Building • Partial F-test • Polynomial regression and nonlinear regression models • Regression models with interaction • Dummy variables

	Date	Assignments Due	Topics Covered
6	5/7/2023 (PM Session)		Model Building • Introduction to Variable Selection • Variable Selection (Stepwise Regression) • Model Building Process
7	5/14/2023 (AM Session) – **the only consecutive Sunday**	Midterm Exam (Take-Home - will be posted after the class on May 7. Complete and submit it in **printed form** anytime on 5/14.)	Logistic Regression (very briefly) Chi-Squared Tests • Chi-Squared Goodness-Of-Fit Test • Chi-Squared Test of a Contingency Table Nonparametric Statistics • Spearman Rank Correlation
8	5/14/2023 (PM Session) – **the only consecutive Sunday**		Time-Series Analysis and Forecasting • What is Time Series? • Forecasting and Methods • Time Series Components • Forecast Accuracy Measures • Naïve Forecasts • Smoothing Techniques
9	6/4/2023 (AM Session)		Time-Series Analysis and Forecasting • Trend and Seasonal Effects • Randomness and Random Walk Model • Autoregressive Modeling • Modeling Seasonal Patterns
10	6/4/2023 (PM Session)	Homework 3 (Group)	Statistical Process Control • Introduction to Statistical Process Control • Process Variability • Introduction to Control Charts • Variable Control Charts • Attribute Control Charts
11	6/11/2023 (1:30 PM – 4:30 PM)	Final Exam (In-class or Take-home TBD)	Scope: topics after the midterm exam. The list of the topics for the final exam will be provided in the class.