

MGB-203B – Forecasting & Managerial Research Methods

PREREQUISITE: MGB/P/T 203A – Data Analysis for Managers

TERM: Summer Quarter 2019

LECTURES: Saturday: 9:00 a.m. – 12:00 p.m. and 1:00 p.m. – 4:00 p.m.
Bishop Ranch - Room BR-1502
June 22, July 6, 20, August 3, 17, and August 31 (Final)

INSTRUCTOR: Mehul Rangwala
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OFFICE HOURS: Anytime I am not teaching.

I'm pretty approachable so, please feel free to contact me any time if you have any questions. We can get on a Zoom call and get your question answered anytime.

I will stay back after every class if you want to meet me in person.

**TEXT AND OTHER
RESOURCES:**

1. *Statistics for Management and Economics, 11th Edition* by Gerald Keller, Cengage Learning.
ISBN-13: 9781337296946, ISBN-10: 1337296945

2. Professor Tsai's notes for the 203B course from the UC Davis bookstore. (During the quarter, if you have any questions about the topics/contents on these notes, please contact me and NOT Professor Tsai.)

**MATERIAL
TO BE COVERED:**

Chapters 14 – 21 (see the pages 4 and 5 for details) + an extra topic on Introduction to Multivariate Analysis.

**NOTES AND
HANDOUTS:**

I will upload the notes and in-class exercises 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 these very helpful when working on the exams and homework.

**COMPUTER
PACKAGE:**

Minitab. You can rent Minitab (version 18) from
<http://www.onthefhub.com/minitab/>

PLEASE NOTE: Individuals using Macs will need to install Windows either natively using Apple Boot Camp or in a virtual environment. I will NOT use Minitab Express in the class as it is the lightweight version of Minitab and doesn't contain some techniques that will be needed for the course.

Refer to the following link from Minitab for additional information. <http://support.minitab.com/en-us/installation/frequently-asked-questions/other/minitab-companion-on-mac/>

**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 (<u>Group</u>)	30%
Midterm (<u>take-home</u>)	30%
Final Exam (<u>take-home</u>)	40%

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 203A 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 the first few minutes of the first lecture reviewing some key concepts from the 203A 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. Please read the assigned chapters/topics prior to the class. After the class, re-read the chapter and the class notes. Summarize what you have learned. I will be assigning several practice problems (separate from homework problems) which will be ungraded. These are purely for your practice and for deepening your understanding of the material and will not be graded. However, the assigned homework problems must be turned in by the due date for credit.
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 be varied. 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.
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.

Schedule on the next page

Schedule (Tentative)

This is a **tentative** schedule. It may be adjusted according to the pace of the class.

	Date	Assignments Due	Topics Covered
1	Sat, June 22, 2019 (AM Session)		Recap of inferential statistics from 203A Chapter 12 – Section 12.1 Review Chapter 13 – Sections 13.1 and 13.3 Review Chapter 14 – Analysis of Variance • One-Way Analysis of Variance • Multiple Comparisons
2	Sat, June 22, 2019 (PM Session)		Chapter 14 – Analysis of Variance (contd.) • Randomized Block Design • Two-Factor Analysis of Variance Chapter 15 – Chi-Squared Tests • Chi-Squared Goodness-Of-Fit Test • Chi-Squared Test of a Contingency Table
3	Saturday, July 6, 2019 (AM Session)	Homework 1 (Group)	Chapter 16 – Simple Linear Regression and Correlation • Model building • Estimating and interpreting coefficients • Model fitting • Regression Diagnostics 1 • Point and Interval Prediction
4	Saturday, July 6, 2019 (PM Session)		Chapter 17 – Multiple Regression • Model building • Estimating and interpreting coefficients • Regression Diagnostics (Multicollinearity and Durbin-Watson test)
5	Saturday, July 20, 2019 (AM Session)	Homework 2 (Group)	Chapter 18 – Model Building • Polynomial regression and nonlinear regression models • Regression models with interaction • Dummy variables
6	Saturday, July 20, 2019 (PM Session)		Chapter 18 – Model Building • Variable Selection (Stepwise Regression) • Model Building Chapter 19 – Nonparametric Statistics • Wilcoxon Signed Rank and Rank Sum tests

	Date	Assignments Due	Topics Covered
			• Kruskal-Wallis test for completely randomized design • Friedman test for randomized block design
7	Saturday, August 3, 2019 (AM Session)	Midterm Exam (Take-Home - will be posted on July 21 st . Complete and submit by August 3.)	Chapter 19 – Nonparametric Statistics • Spearman Rank Correlation Chapter 20 – Time-Series Analysis and Forecasting • Time-Series Components • Smoothing Techniques
8	Saturday, August 3, 2019 (PM Session)		Chapter 20 – Time-Series Analysis and Forecasting • Trend and Seasonal Effects • Introduction to Forecasting • Forecasting Models
9	Saturday, August 17, 2019 (AM Session)	Homework 3 (Group)	Chapter 21 – Statistical Process Control
10	Saturday, August 17, 2019 (PM Session)		Chapter 21 – Statistical Process Control (Continued) Not in your text (will provide notes) – Introduction to Multivariate Analysis (Principal Components Analysis, Discriminant Analysis, and Factor Analysis.)
11	Saturday, August 31, 2019	Final Exam (Take-Home - will be posted on August 17. Complete and submit by August 31.)	