Business 228
Data Analytics and Modeling
Fall 2020

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Hours: MW 4 - 6 p.m. by appt. (on Starfish)

Course Description:
Focuses on the importance of data analysis and its role in decision making. Students should be able to create quantitative models for summarizing, visualizing, understanding, and applying useful information gleaned from large data sets.

Prerequisites/Requirements:

- Economics 221 ("C" or better). Any student without this prerequisite will be administratively dropped from the class. In addition, a student in this class should be able
    - To recognize and use simple mathematical notation, including the order of operations inherent in such,
    - To enter data into an Excel spreadsheet.

  If you do not know these skills, you should spend some time outside of class refreshing those areas.
- You need Excel on your personal computer, and you should make sure that it contains the Analysis ToolPak (also available on Macs). A quick Google search should tell you how to turn on those functions.

Text: None: Various handouts and reading assignments

Americans with Disabilities Act - Classroom Accommodations
Any student with a disability who requires classroom accommodations must contact the Counseling and Learning Center to receive an accommodations letter. Accommodations will be given only after receipt of this letter. Accordingly, students needing accommodations are encouraged to contact the Counseling Center at the beginning of the semester, as accommodations will not be applied retroactively to coursework that has already been completed.

Goals & Outcomes:

1. Critical/Analytical Thinking and Problem Solving. Business majors will think critically to analyze a business problem and to define logical solutions.
2. Information Systems and Technology. Business majors will be able to describe the impact of technology on business and to identify, evaluate and use information technology to enhance personal and organizational productivity

Performance Objectives

1. Given a set of data, a student can
    a. Input/Import the data into an Excel worksheet,
    b. Sort the data according to various variables,
    c. Merge two matrices of data using VLookup and HLookup in Excel,
    d. Calculate the mean, median, and standard deviation of an array,
    e. Define what the descriptive statistics describe concerning the array,
    f. Create graphs or charts (including one scatterplot) describing various variables from the dataset,
    g. Perform statistical tests (T-tests, Chi-square tests, etc.) on hypotheses.
2. Given a dataset provided by the instructor, the student can
    a. Import the data into an Excel worksheet,
    b. Clean the data into a workable dataset,
    c. Analyze the data,
    d. Describe the insights gleaned from the dataset, both with visuals and in presentation form,
    e. Present the data, analysis, and insights in a clear, concise manner,
    f. Define the next steps to be pursued to further analyze the data.
3. Given two arrays of numbers (X & Y) and with formulas provided,
    a. Calculate the regression equation showing the relationship between the two variables,
    b. Calculate the forecast for Y given a specific X,
    c. Calculate the probability of a range of Y's given the forecast found for a specific X,
    d. Create an ANOVA table,
    e. Calculate the strength of the model using R^2 and *Adjusted* R^2.
4. Given the Y and forecasted Y variable arrays, create an ANOVA table.
5. Given two arrays of numbers (X&Y), input the arrays into an Excel spreadsheet and
    f. Calculate the regression equation showing the relationship between the two variables,
    g. Calculate the forecast for Y given a specific X,
    h. Calculate the probability of a range of Y's given the forecast found for a specific X, and
    i. Identify the R^2.
6. Given a printout of an Excel solution of a multiple linear regression problem,
    j. Identify (circle) the statistically significant variables at the designated percentile confidence level, and
    k. Calculate the probability of a specific Y range given a set of X values.
7. Given a word problem or case with multiple alternatives and multiple parameters affecting those alternatives, create an Excel model that
    l. is calculated correctly,
    m. is well documented including separate areas for inputs, outputs, and calculations, and
    n. uses different colors, fonts, and backgrounds to denote different areas.
8. Given a word problem with the necessary probability distributions and a source of random numbers, create a Monte Carlo simulation either on paper or in Excel to answer a given question.

Requirements:

1. Attendance is vital. I do not use test banks downloaded from textbooks. I create each exam and assessment so all of it will reflect what I know has been discussed in class. I will monitor your quizzes, attendance in class and logins to Blackboard to measure attendance. However, in this virtual world, attendance at the class sessions will NOT be a part of your final grade. There are simply too many disruptions in life to make that a requirement. But I can assure you that repeated absences will affect your grades in other ways. It has been my experience that students who miss class do not perform well. I assume you are adults and can make your own decisions as well as live with the consequences. So, I also will not listen to any excuses about poor performance. If you decide to miss class, do not bother asking me to explain the material again, to allow you to makeup in-class assignments, or restate homework assignments. It is your responsibility to keep up with the requirements of the class on BlackBoard.
2. A grade of Incomplete will be granted only by exception. Do not assume you have an Incomplete until you have consulted with me. An Incomplete must be corrected by the beginning of the next term.
3. Makeup exams will <u>not</u> be given. Given this virtual world, you will have some flexible times to take the exam so there should be no reason to miss one. If for some odd reason it happens, your final exam grade will simply substitute. **<u>No</u> exam grades will be dropped.** A good student needs to be consistent, prepared for every exam or assignment.
4. Students who present a disruption to the class and impair the ability of other students to learn the lessons will be removed from the sessions and their names will be given to the administration.
5. Given a virtual environment, a dress code may seem odd. But I do expect to see you in class so you should be prepared to be on camera. I expect you to be wearing a shirt (not tank tops). Your appearance on camera should be reasonable.
6. It is understood I reserve the right to change this syllabus at any time during the semester with proper notification given to the students. This syllabus is not a contract but simply a guide to assist students in their planning.

Grading:

Exam 1 (Feb 17)	100 pts	Team Data Project (Due Nov 9)	100 pts
Exam 2 and 3 (March 17, April 12)	150 pts each	Final Exam (Comprehensive)	200 pts
Individual Modeling Project (Due Nov 2)	100 pts	Quizzes & Participation	100 pts
		Total	**900 pts**

Scale:

Grade	**Range**	**Grade**	**Range**
A	837-900	C+	693-719
A-	810-836	C	630-692
B+	783-809	D	540-629
B	747-782	F	<540
B-	720-746		

Statement on Academic Honesty:

Part of being a Man of Morehouse is exhibiting integrity in all aspects of your life. You have the obligation as students to exhibit honesty and to respect the ethical standards of Morehouse College. According to official Institute policy listed in the catalog, the professor has the right to assign any academic penalty, including failure, which they believe to be necessary, as well as the appropriate judicial review. Students should not seek, receive, accept or give assistance on individual assignments, whether in class or out of class. Electronic devices (cell phones, PDAs, etc.) are not allowed during exams, except as explicitly noted by the professor. Therefore, turn them off and put them away before the exams and do not refer to them during the exams. Contribute fairly to group work. Always cite reference materials that you use (including materials from the Internet). Do not plagiarize, defined as passing off other's work as your own. Examples include but are not limited to "cutting and pasting" information off the Internet. When in doubt, err on the safe side. If issues of academic integrity arise in this class, consult your professor immediately.

Course Schedule

Date	**Subject**	**Topic**
Feb 1	Syllabus/Intro to Data Analytics	
Feb 3	Data Acquisition and Cleanup	Location of Datasets, Cleaning Data, Intro to Excel, Sorts, Vlookups, Hlookups, Searches
Feb 8	In-class Practice	
Feb 10	Data Acquisition and Cleanup	Handling Missing Data, Pivot Tables
Feb 15	In-Class Practice	
Feb 17	**Exam 1**	
Feb 22	Data Analysis, Part 1	Descriptive, Predictive, and Prescriptive Descriptive: Mean, Modes, ANOVA, F-Tests, T-tests
Feb 24	In-Class Practice	
Mar 1	Data Visualization	Graphs, Charts, Scatterplots
Mar 3	Data Analysis, Part 2	Predictive: Regression (manual)
Mar 8		Predictive: Regression (manual)
Mar 10		Multiple Linear Regression (interpretation)
Mar 15	In-Class Practice	
Mar 17	**Exam 2**	
Mar 22	Data Analysis, Part 2	Regression (Excel)
Mar 24	In-Class Practice	Regression (Excel)
Mar 29	Data Analysis, Part 3	Monte Carlo Simulation (Manual)
Mar 31 - Apr 2	**Mental Health Break/Good Friday**	
Apr 5		Monte Carlo Simulation (Excel)
Apr 7	In-Class Practice	Monte Carlo Simulation
Apr 12	**Exam 3**	
Apr 14	Data Ethics	**(Individual Project Due)**
Apr 19	Data Communication/Storytelling	
Apr 21	**Team Data Projects Due/ Project Presentations**	
Apr 26	**Project Presentations**	
Apr 28		
Apr 29 - 30	**Reading Period**	
May 3 - 7	**Finals Week**	