Department of Technology Management and Innovation
MG-GY 9753 - Business Analytics (MOT)
Fall 2019

Professor:	JeanCarlo Bonilla, PhD
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Office/Hours:	Tuesday's 4pm- 6pm By Appointment 5 MetroTech Center, LC401

Course Pre-requisites: Probability, Statistics, Linear Algebra, Excel

Course Description:

Business analytics is a set of data analysis and modeling techniques for understanding business situations and improving business decisions. This course introduces business analytics concepts, methods and tools with concrete examples from industry applications. In the first part of the course, we will focus on descriptive analytics and exploratory data analysis concepts with a refresher on basic probability and statistics. In the second part, we will cover principles, techniques, and techniques for spatial data, time series, and text as data. The final part of the course will introduce a project that links business impact and modern data analytics techniques for managerial decision making in functional areas, including finance, marketing, and operations.
Throughout the course, we explore the challenges that can arise in implementing analytical approaches within an organization. The course emphasizes that business analytics is not a theoretical discipline: these techniques are only interesting and important to the extent that they can be used to provide real insights and improve the speed, reliability, and quality of decisions.

Suggested Textbook by Topic

- Essentials of Business Analytics. Jeffrey D. Camm, James J. Cochran, Michael J. Fry, Jeffrey W. Ohlmann, and David R. Anderson. Cengage Learning, 2014.
  AKA " Essentials"

- *Excell:* Management Science: The Art of Modeling with Spreadsheets, Powell and Baker. Wiley

- *R:* Data Mining and Business Analytics with R, Johannes Ledolter, 1st Edition

- *Business Analytics:* Keeping Up with the Quants: Your Guide to Understanding and Using Analytics, Thomas H. Davenport & Jinho Kim, 2013

- *Data Visualization:* The visual display of quantitative information, Eduard R. Tufte, 2001

- *Scoping:* Thinking with Data How to Turn Information into Insights, Max Shron, 2014

Required Analytics Cases

Additional reading materials will be available in NYUClasses. These cases showcase the application of business analytics in operations, marketing, finance, strategy, product development, human resources, and sales.

> *AKA " Cases"*

Software

This course will require the use RStudio and Tableau

Course Assignments and Grading:

Grading Policy
● Weekly Assignments - 30%
○ Mostly data analysis and programming assignments. Some assignments will include theoretical aspects to make sure students understand the important mathematical concepts in data analytics.
● In-class Cases & Data Dives - 10%
○ In-class data dives are hands on sessions around the entire data life cycle. These include project scoping, data manipulation and integration, analysis, visualization, and reporting.
● Projects – 40%
○ This is the capstone experience of the course where students will form groups consisting of between 3 and 4 people depending upon the size of class. Teams will build a project using a publicly accessible datasets. They will motivate the business problem, do enough explanatory analysis and generate data driven strategic insight. For each project, teams will provide a brief presentation on the project scope, data and methods utilized, findings, and business implications.
○ This courses builds around 2 unique projects:
■ Project 1: Descriptive Analytics - 20%
■ Project 2: Predictive Analytics - 20%
● Exam – 20%
○ Two exams on covering theory and applications
■ Midterm Exam: 10%
■ Final Exam: 10%
For the purposes of computing GPAs, the following schedule is used:

Letter Grade	100% Scale	Garde point value
A	100-95	4.0
A-	94-90	3.7
B+	89-85	3.3
B	84-80	3.0
B-	79-75	2.7
C+	74-70	2.3
C	69-65	2.0

F	64-0	0

Course Web Page
You must have access to the NYU Classes site (http://classes.nyu.edu/). All announcements and class-related documents (supplemental and suggested readings, discussion questions, etc.) will be posted there.
Some class announcements will be distributed via NYU e-mail. Thus, it is important that you actively use your NYU e-mail account, or have appropriate forwarding set up on NYU Home (https://home.nyu.edu/).
In addition, lecture, data, and code will be posted in the following github repository
https://github.com/jcbonilla/BusinessAnalytics

Course Topic Outline

Module	Dates	Topics
Overview & Context	*Week 1* *Sep 4*	Competing on Analytics in today's Business Landscape. The data lifecycle. Analytics vs. Intelligence vs. Data Science.
Descriptive Analytics	*Week 1 - 4* *Sep 4 - Sep 25*	Using R scripts, we will review concepts in descriptive statistics such as measures of central tendency, measures of dispersion, and measures of association between two variables. In this module we will cover the principles of hypothesis testing, correlations analysis, and statistical significance. In addition, this will be the first session on effective data visualization
		In addition, this module covers fundamentals of exploratory data analytics and Tableau. We will cover the approach and philosophy of Exploratory Data Analysis (EDA) for understanding business situations and improving business decisions
Exams	*Week 5* *Oct 2*	**Project 1 - Dashboard** Project presentations. Team will have 10-15min to showcase a project using descriptive analytics
	Week 5 *Oct 2 - 16*	**Midterm Exam**

Predictive Analytics	*Week 6-10* *Oct 16 - Nov 13*	This module covers the basics of regression analysis. Our emphasis will be on applications and interpretation of the results for making real life business/policy decisions and the mathematical and statistical properties of the techniques used to produce these results. In order to provide a broad intuition of the concepts and methods, we will use data and examples from marketing decision making such as segmentation, estimating market potential and forecasting demand, etc. We will continue covering regression analysis including non-linear transformations and dummy variables. In addition to advanced regression, we will cover prediction and classification trees. Finally, we will learn the principles of model selection, model performance, and operationalizing models.
	Week 11 *Nov 20*	**Project Consultations** This session is dedicated to teamwork and preparation for project presentations. Together we will review project plans against actual progress and reposition project deliverables for the final analytical sprint.
	Week 12 *Nov 27*	**Project 2 - Prediction** Project presentations. Team will have 10-15min to showcase a project using predictive analytics
Text Analytics	*Week 13-14* *Dec 14-11*	Using text as data presents an opportunity to move words into document-term-matrices that can be analyzed via statistical analysis. In this lesson we will cover text processing, analysis, and interpretations of summary statistics of a corpus
Exams	*Week 15* *Dec 18*	**Final Exam**

<u>**Academic Integrity:**</u>

All students are responsible for understanding and complying with the NYU Statement on
Academic Integrity.

Academic Integrity for Students at NYU

This policy sets forth core principles and standards with respect to academic integrity for students at
New York University. Each school at New York University may establish its own detailed
supplemental guidelines for academic integrity, consistent with its own culture, and consistent with
the University-wide general guidelines described in this document.

At NYU, a commitment to excellence, fairness, honesty, and respect within and outside the
classroom is essential to maintaining the integrity of our community. By accepting membership in
this community, students take responsibility for demonstrating these values in their own conduct and
for recognizing and supporting these values in others. In turn, these values will create a campus
climate that encourages the free exchange of ideas, promotes scholarly excellence through active and
creative thought, and allows community members to achieve and be recognized for achieving their
highest potential.

In pursuing these goals, NYU expects and requires its students to adhere to the highest standards of
scholarship, research and academic conduct. Essential to the process of teaching and learning is the
periodic assessment of students' academic progress through measures such as papers, examinations,
presentations, and other projects. Academic dishonesty compromises the validity of these
assessments as well as the relationship of trust within the community. Students who engage in such
behavior will be subject to review and the possible imposition of penalties in accordance with the
standards, practices, and procedures of NYU and its colleges and schools. Violations may result in
failure on a particular assignment, failure in a course, suspension or expulsion from the University,
or other penalties.

Faculty are expected to guide students in understanding other people's ideas, in developing and
clarifying their own thinking, and in using and conscientiously acknowledging resources - an
increasingly complex endeavor given the current environment of widely available and continually
emerging electronic resources. In addition, students come to NYU from diverse educational contexts
and may have understandings regarding academic expectations that differ from those at NYU. NYU
values and respects all academic traditions; however, while at NYU, students are expected to adhere
to the norms and standards of academic integrity espoused by the NYU community and will be
assessed in accordance with these standards. Students should ask their professors for guidance
regarding these standards as well as style guide preferences for citation of sources for assignments in
their courses.

Following are examples of behaviors that compromise the academic and intellectual community of
NYU. The list is not exhaustive. Students should consult the websites and guidelines of their
individual schools for an extended list of examples and for further clarification.

1. Plagiarism: presenting others' work without adequate acknowledgement of its source, as though it
were one's own. Plagiarism is a form of fraud. We all stand on the shoulders of others, and we must

give credit to the creators of the works that we incorporate into products that we call our own. Some examples of plagiarism:
- a sequence of words incorporated without quotation marks
- an unacknowledged passage paraphrased from another's work
- the use of ideas, sound recordings, computer data or images created by others as though it were one's own

2. Cheating: deceiving a faculty member or other individual who assess student performance into believing that one's mastery of a subject or discipline is greater than it is by a range of dishonest methods, including but not limited to:
- bringing or accessing unauthorized materials during an examination (e.g., notes, books, or other information accessed via cell phones, computers, other technology or any other means)
- providing assistance to acts of academic misconduct/dishonesty (e.g., sharing copies of exams via cell phones, computers, other technology or any other means, allowing others to copy answers on an exam)
- submitting the same or substantially similar work in multiple courses, either in the same semester or in a different semester, without the express approval of all instructors
- submitting work (papers, homework assignments, computer programs, experimental results, artwork, etc.) that was created by another, substantially or in whole, as one's own
- submitting answers on an exam that were obtained from the work of another person or providing answers or assistance to others during an exam when not explicitly permitted by the instructor
- submitting evaluations of group members' work for an assigned group project which misrepresent the work that was performed by another group member
- altering or forging academic documents, including but not limited to admissions materials, academic records, grade reports, add/drop forms, course registration forms, etc.

3. Any behavior that violates the academic policies set forth by the student's NYU School, department, or division.

Moses Center Statement of Disability
If you are student with a disability who is requesting accommodations, please contact New York University's Moses Center for Students with Disabilities at 212-998-4980 or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at www.nyu.edu/csd. The Moses Center is located at 726 Broadway on the 2nd floor.