



INTRODUCTION TO BUSINESS ANALYTICS

COURSE DETAILS

Instructor: Jane Doe
Office: DePaul Center Room XXX
Email: janedoe@depaul.edu
Phone: 312.362.XXXX

Class Hours: T/Th 1:30-3:00pm
Class Location: DePaul Center XXXX
Office Hours: Th. 3:00-5:00pm
Course Website: D2L

COURSE DESCRIPTION

Businesses are increasingly turning to data analytics to evaluate and improve business decisions. The ability to collect, analyze, and use data to inform important decisions is a critical skill for modern business students. This course will introduce students to the growing role of big data and the quantitative strategies to answer businesses questions. Students will analyze business cases in which data have helped businesses make better decisions, exposing them to real world applications of analytics to solve problems in accounting, economics, finance, hospitality, management, and marketing. The course will also introduce students to some basic statistical techniques and the spreadsheet software, Excel, which students will use to analyze specific business problems.

LEARNING OUTCOMES

- Understand the big picture of data analytics as a transformative force in the world of modern business
- Recognize the ethical implications of collecting, managing, and using data in business.
- Define “big data” and the increasing role of evidence-based decision making to support business decision making.
- Explain the differences between predictive, prescriptive, and descriptive analytics, and the business questions that can be answered with each approach.
- Use Excel to perform basic statistical operations and prepare visual representations of business data.
- Apply the principles of business analytics to examples in marketing, finance, management and entrepreneurship, accounting, and economics.
- Communicate the insights and applications identified within quantitative data
- Identify opportunities to use analytics to address unstructured business problems

COURSE READINGS

There is no required textbook for the course, but assigned readings are listed below in the Course Schedule. These readings will be posted to D2L at the start of the quarter. In addition to the assigned readings, you are required to select one of the books below to read during the first half of

the course. You will use the content of your selected book to inspire a group project that will be completed as part of the course. You are to select one book from the following list: [Note to instructor: We recognize that you may want to limit and/or amend this list.]

- Algorithms to Live By: The Computer Science of Human Decisions (Christian & Griffiths)
- Big Data: A Revolution That Will Transform How We Live, Work, and Think (Mayer-Schönberger & Cukier)
- Dataclysm: Who We Are (When We Think No One's Looking) (Rudder)
- Data and Goliath: The Hidden Battles to Collect Your Data and Control Your World (Schneier)
- Everybody Lies: Big Data, New Data, and What the Internet Can Tell Us About Who We Really Are (Stephens-Davidowitz)
- How Not to Be Wrong: The Power of Mathematical Thinking (Ellenberg)
- Naked Statistics: Stripping the Dread from the Data (Wheelan)
- The Power of Experiments: Decision Making in a Data Driven World (Luca and Bazerman)
- Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die (Siegel)
- The Signal and the Noise: Why So Many Predictions Fail...But Some Don't (Silver)
- Superforecasting: The Art and Science of Prediction (Tetlock & Gardner)
- Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy (Cathy O'Neill)

ONLINE EXCEL MODULE

Students will enter the course with varying levels of prior exposure to, and experience with, data organizing programs like Microsoft Excel, Google Sheets, and Apple's Numbers. To ensure that all students have an adequate understanding of these common data organizing programs, every student must complete an online module focused on Microsoft Excel (but generalizable to the other programs) by the third week of class. The module can be found on the course D2L page. [Note to Instructors: Some possible online modules include LinkedIn Learning, which is accessible via Campus Connect. The online module should cover some basic statistics (means, standard deviations, and correlation coefficients) as well as some basic data visualization tools (histograms, scatter plots, bar charts, and line graphs).]

PROBLEM SETS

To help you start looking at business problems through the lens of data analytics, you will be assigned three problems sets. The first problem set will test your excel skills and will be due in week 4. The second two problem sets will be assigned in the second half of the course and will give you the opportunity to work through a couple business cases with its associated data. The goal of these problem sets will be to propose a quantitative approach to a business question and execute an empirical analysis.

GROUP PROJECT + PRESENTATION

The group project in Business Analytics requires teams of three students to select and read one of the books listed above. Upon reading the book, the team is to identify **one** specific business example in which data either 1) improved business decision making in a particular context, or 2) worsened business decision making in a particular context. In doing so, the team should identify: a) the original business problem someone was trying to solve, b) the strategies, tools, and/or approaches considered for solving the problem, c) how or why the decision-maker(s) ultimately selected the approach taken, d) whether that business analytics approach worked or did not work (and why), e) how the group might have gone about answering the original problem differently using an analytics or data-driven approach (e.g., what kind of data would *you* have collected, how would *you* have collected it, how would *you* have analyzed the collected data, broadly speaking).

The group will submit a 5-7 page (1” margins, 12 pt. Times New Roman font, double-spaced) paper detailing its responses to the above issues, where the data visualizations should be embedded in the text. The team should also produce a 5-10 minute video where they present the business problem and solution described in the paper. Both the presentation and paper will need to be uploaded to D2L. This project will be due in week 6 of the class and count as the course midterm. Details on grading the Group Project and Presentation can be found in the Course Grading section below.

Final Exam

The final exam for the course will bring together the case-based material in the second half of the course and test a student’s ability to think through a business problem and the ways in which data analysis could help inform business decisions related to accounting, economics, finance, management, and marketing.

COURSE SCHEDULE

Introduction to Business Analytics is a 10-week course divided into two parts:

PART I: THE BASICS
Week 1: The Growing Role of Business Analytics
<p>Objective: Data analytics is transforming the world of business. The course begins with an introduction to business analytics and its growing role in modern business decision-making. You will learn about how companies are expanding their use of data analytics across every business discipline. In this introduction, we will discuss common mistakes in the absence of data analytics, such as drawing broad conclusions from small samples (“fooled by randomness”). You will then learn about how business analytics helps provide evidence-based decision-making to prevent these mistakes. In addition, you will learn about the ethics of data collection, management, usage, and privacy, which is an increasing public concern. Lastly, you will learn about the growing number of jobs and career opportunities related to business analytics.</p>
<p>Suggested Readings:</p> <ul style="list-style-type: none">Business Analytics: What It Is & Why It’s Important (HBS) – D2LThe Law of Small Numbers, by D. Kahneman (Ch. 10 in Thinking, Fast and Slow)The Age of Analytics: Competing in a Data-Driven World (McKinsey) – D2LBig Data’s Surprising Uses: From Lady Gaga to CIA (InformationWeek) – D2LBig Data is Getting Bigger, So Are the Privacy and Ethical Questions – D2LEvidence-Based Management (HBR) – D2LDecisions Without Blinders (HBR) – D2LThe Ethics of Collecting Data – video
<p>Assignment: Online Excel Module (due Week 3)</p>

Week 2: Big Data Collection and Ethics

Objective: In the last ten years the ability of companies to collect more and more data relating to every aspect of their business—from the production process to the wants and desires of their customers—has expanded dramatically. Businesses have massive amounts of data and are rapidly exploring ways to maximize the value of this data. This week, you will be introduced to the formal definition of Big Data, how Big Data differs from other types of information, how this data is being collected, and the ethical implication of collecting and using this data. You will also learn about the opportunities and challenges that having *this* much information affords to businesses and decision-makers throughout business organizations.

Suggested Readings:

[Big Data Causes Concern and Big Confusion \(CIO\)](#) – D2L
[The Real Promise of Big Data: Changing How Humans Solve Problems](#) – D2L
[Why Big Data is a Big Deal \(Harvard Magazine\)](#) – D2L
[4 Ways Big Data Will Change Every Business \(Forbes\)](#) – D2L
[Beyond Big Data, by H. Varian \(Business Economics, Vol. 49, pp. 27-31\)](#)
[How Companies are using Big Data and Analytics \(McKinsey & Co.\)](#)
[Analytics 3.0 \(HBR\)](#) – D2L
[Big Data: The Management Revolution \(HBR\)](#) – D2L
[Building the AI-Powered Organization \(HBR\)](#) – D2L
[Big Data Problems](#) – video

Assignment: Online Excel Module (due Week 3)

Week 3: Answering Business Questions with Data Analytics

Objective: All data analysis starts with a *question*. Your business education will teach you the *right* questions to ask and this course will introduce you to the quantitative strategies for answering these questions. Most questions in data analytics boil down to one of three types: 1) **predicting** an outcome, 2) **evaluating** information, or 3) **identifying** a causal relationship. Business analytics applies these quantitative strategies from data analytics to business questions. Different types of questions require different types of analyses, and knowing which analysis to perform is an important part of business analytics. Other topics discussed this week include (i) the difference between correlation and causation, and (ii) data mining vs. structured analysis.

Suggested Readings:

[Analytics at Google: Data-Driven Decision Making](#) – D2L
[Amazon's Recommendation Secret](#) – D2L
[For the Airline Industry, Big Data is Clear for Take-Off](#) – D2L
[A Predictive Analytics Primer \(HBR\)](#) – D2L
[Why Everyone Needs Analytical Skills \(Harvard Business Publishing\)](#) – D2L

Assignment: Problem Set #1 (due Week 4)

Week 4: The Basic Tools of Business Analytics

Objective: Now that you have learned some of the ways analytics can address real-world business problems, it is time to start introducing some of the basic tools we use to organize, analyze, and visualize business data. This week you will be introduced to data analysis software packages and how they differ across business disciplines. We will explain how software and statistics can be combined to help with visual presentations of data (e.g., bar charts, scatter plots) and some basic statistical concepts (e.g., means, standard deviations, correlation coefficients, and the difference between correlation and causation). In addition to having completed your online Excel module by next week, you will also be assigned a second problem set (due Week 6) that starts building bridges between the topics in business analytics we have discussed so far and the tools of business analytics introduced today.

Suggested Readings:

[The Popularity of Data Science Software](#) – D2L

[What’s the Best Statistical Software?](#) – D2L

[39 Studies About Human Perception in 30 Minutes](#) – D2L

[The Data Visualization Checklist](#) – D2L

[Data Visualization: Contributions to Evidence-Based Decision Making](#) – D2L

[The Role of Stories in Data Storytelling](#) – D2L

[What is Statistics? Crash Course](#) – D2L

Assignment: Group Project (due Week 6)

PART II: THE APPLICATION OF ANALYTICS ACROSS BUSINESS DISCIPLINES

Week 5: Data Analytics as a Predictive Tool – Applications in Marketing

Objective: Understanding consumers and identifying market opportunities provide savvy marketers with a competitive edge. Indeed, conducting smart marketing research, correctly analyzing the data collected, and discovering insights from the data can make or break a company. One example of this is quantifying the effect of advertising on sales. This week you will focus on two different real world marketing case examples in which data analytics play a pivotal role.

Suggested Readings:

Case: A Punch in the Face(book) (Mourey) – D2L

Case: Finding the Magic: Disney, Data, and Dreaming at the Magic Kingdom (Mourey) – D2L

Assignment: Group Project (due Week 6)

Week 6: Data Analytics as a Predictive Tool – Applications in Finance

Objective: Finance is about finding the best use of money and analytics provides a tool for making good financial decisions. Financial managers use data for strategic decisions, investors use data for investment decisions, and financial institutions use data in every transaction. This week you will focus on two different real world finance case examples in which financial institutions have used data analytics to improve the performance of their businesses, from predicting creditworthiness to algorithmic trading.

Suggested Readings:

Case: Do You Qualify for an Online Loan? Big Data Will Decide (Black) – D2L
Case: Quant Trading and the Replacement of Humans (Black) – D2L

Week 7: Data Analytics as an Evaluative Tool – Applications in Management & Entrepreneurship

Objective: For many organizations, success is largely dependent on people and ideas. Those who are able to successfully compete on people, or appropriately evaluate new ideas for launching a business, are optimizing their chances for success. This week you will focus on two different real world case examples in which organizations have used data analytics to predict whom to hire and evaluate worker productivity, and how entrepreneurial firms use data to support decision-making.

Suggested Readings:

Case: Agoda: People Analytics and Business Culture (A) Ivey Publishing– D2L
Case: SunnyBee (A): The Entrepreneurial Decision & (B3): Sunny Bee Makes Better Decisions Using Business Analytics, Babson Entrepreneurial Leader Collection – D2L

Assignment: Problem Set #2 (due Week 8)

Week 8: Data Analytics as an Evaluative Tool – Applications in Accounting

Objective: Accounting Analytics explores how financial statement data and non-financial metrics can be linked to financial performance. Further, learning how data is used to assess what drives financial performance and to forecast future financial scenarios will ultimately determine the success of the company. This week you will focus on two different real world accounting case examples in which organizations have used data analytics to detect fraud and value a business.

Suggested Readings:

Case: Bibitor, LLC (Reddic) – D2L
Case: ? – D2L [Some options may be found here:

<https://www.pwc.com/us/en/careers/university-relations/tax-case-studies-form.html>]

Week 9: Data Analytics to Identify Causality – Applications in Economics

Objective: Economics as a discipline begins with a few basic assumptions and utilizes these as building blocks for models of behavior. Models are only useful if they can be tested and quantified, and economists have developed a large toolkit of statistical models to do just that. These empirical approaches are also quite valuable to businesses who are trying to make the best business decisions including how best to price their products.

Suggested Readings:

Case: Analytics for Sustainable Products: The Case of Sustainable Beef (Babson) – D2L

Case: Regulus Solar Power Inc., Price Demand Elasticities (Ives) – D2L

Article: Economists (and Economics) in Tech Companies (Journal of Economic Perspectives – D2L

Assignment: Problem Set #3 (due Week 10)

Week 10: Preview of Advanced Analytics and Careers in Analytics

Objective: Highlight the introductory nature of the material covered in the class and discuss the ways in which more sophisticated analytical techniques could be even more useful to businesses. Discuss the demand for students with excellent analytics skills and potential careers in analytics

Readings: [Amazon Likely the Second Largest Employer of PhD Economists](#)

COURSE GRADING

To assess the extent to which students have acquired the skills necessary for a strong foundation in business analytics, the various components of the course will be graded as follows:

Problem Set 1:	10%
Problem Set 2:	10%
Problem Set 3:	10%
Group Presentation:	10%
Group Presentation Write-Up:	20%
Final Exam:	30%
Class Discussion and Participation:	10%
TOTAL:	100%

It is important to note that class discussion is an important part of this course, so not only are you expected to attend class, you are also expected to have read the assigned readings for the day and engage in classroom conversation regarding the topics/concepts covered.

GRADING SCALE

The course follows the traditional grading scale, which appears below:

A	93-100	C	73-76
A-	90-92	C-	70-72
B+	87-89	D+	67-69
B	83-86	D	63-66
B-	80-82	D-	60-62
C+	77-79	F	0-59

Grades are *earned* not *given*. While final grades will be rounded to the nearest whole number, students should neither expect extra points nor ask for any other adjustment to their grade.

ADDITIONAL EXPECTATIONS & ACCOMODATIONS

Disability: Please let me know if you need any accommodations for a disability. Some aspects of the course could be modified to facilitate your participation and progress. As soon as you make me aware of your needs, we will work with the Center for Students with Disabilities (CSD) to help determine the appropriate accommodations.

Academic Integrity: All work done for this course must adhere to the University Academic Integrity Policy, which you can review in the *Student Handbook* or by visiting [Academic Integrity at DePaul University \(http://academicintegrity.depaul.edu\)](http://academicintegrity.depaul.edu).

Respect: The classroom is a place for learning. This is best achieved by asking questions, thinking out loud, and even making mistakes. Please treat all of your classmates with respect - we will all struggle at some point or another. If anyone has concerns about the behavior of other people in the class, please see me right away.