

Spring 2022

Meeting days: Tuesday	Instructor title and name: Matt Boyne
Meeting times: 6:00 – 8:45 PM	Phone: 760.715-8071
Meeting location: Southwestern College	E-mail: mboyne@pointloma.edu
Final Exam: May 3, 2022 6:00 PM	Office location and hours: FSB 130, MV or Southwestern as needed
Additional info:	Additional info: Call as needed

PLNU Mission

To Teach ~ To Shape ~ To Send

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Fermanian School of Business Mission

Character – Professionalism – Excellence – Relationships – Commitment - Innovation

As members of a vital Christian community, we strive to provide high quality business programs that equip students to make a positive impact in their workplace and community by connecting purpose to practice.

COURSE DESCRIPTION:

This course explores how leaders can use data to inform the decision making process. Topics include identifying the right information, eliminating bias, understanding predictive analytics, data visualization, communicating uncertainty and addressing challenges to your data. An emphasis is placed on basic methods of gathering, analyzing and communicating data.

COURSE LEARNING OUTCOMES:

Upon completion of this course, students will be able to:

1. Define “big data” and the increasing role of evidence-based decision making to support executive decision making (PLO 1).
2. Explain the differences between predictive, prescriptive, and descriptive analytics, and the organizational questions that can be answered with each approach (PLO 1).
3. Examine the processes of gathering, analyzing, visualizing and communicating data (PLO 1, 2).
4. Demonstrate an understanding of the principles of analytics using examples from a variety of organizational functions and industries (PLO 2).
5. Recognize the ethical implications of collecting, managing, and using data for managers and leaders (PLO 4).

REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES

Student Digital Subscription for the WSJ

HBS Short Cases Analytics (free)

Knaflic, C. N. (2015). *Storytelling with data: a data visualization guide for business professionals*. Hoboken, New Jersey: John Wiley & Sons, Inc.

HBR Guide to Data Analytics Basics for Managers (HBR Guide Series)(2018)

Tableau Student edition (free)

ASSESSMENT AND GRADING

Note: Clearly define a grading policy to avoid any confusion concerning expectations. It is most helpful if at least two things are present: 1) a point distribution and 2) a grading scale.

<u>Sample assignment distribution by percentage:</u>	<u>Sample grade scale:</u>	
<ul style="list-style-type: none">• Homework – 700 Points (70%)• Midterm – 100 Points (10%)• Final Presentation – 200 Points (20%)	A=93-100	C=73-76
	A-=92-90	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

INCOMPLETES AND LATE ASSIGNMENTS

All assignments are to be submitted/turned in by the beginning of the class session when they are due—including assignments posted in Canvas. Late assignments are subject to a 25% penalty. Incompletes will only be assigned in extremely unusual circumstances.

SPIRITUAL CARE

Please be aware PLNU strives to be a place where you grow as whole persons. To this end, we provide resources for our students to encounter God and grow in their Christian faith.

At the Mission Valley (MV) campus we have an onsite chaplain, Rev. Gordon Wong, who is available during class break times across the week. If you have questions for, desire to meet or share a prayer request with Rev. Wong you can contact him directly at mvchaplain@pointloma.edu or gordonwong@pointloma.edu. Rev. Wong's cell number is 808-429-1129 if you need a more immediate response. In addition, on the MV campus there is a prayer chapel on the third floor which is open for use as a space set apart for quiet reflection and prayer.

PLNU COPYRIGHT POLICY

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

PLNU ACADEMIC HONESTY POLICY

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas,

and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog.

See the [Academic Honesty Policy](#) in the Graduate and Professional Studies Catalog for definitions of kinds of academic dishonesty and for further policy information.

PLNU ACADEMIC ACCOMMODATIONS POLICY

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities. Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (EAC@pointloma.edu or 619-849-2486). Once a student's eligibility for an accommodation has been determined, the EAC will issue an academic accommodation plan ("AP") to all faculty who teach courses in which the student is enrolled each semester.

PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their AP in that particular course and/or if they do not wish to utilize some or all of the elements of their AP in that course.

Students who need accommodations for a disability should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student's responsibility to make the first contact with the EAC.

PLNU ATTENDANCE AND PARTICIPATION POLICY

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See [ADC Academic Policies in the Graduate and Professional Studies Catalog](#) in the Graduate and Professional Studies Catalog for additional detail.

USE OF TECHNOLOGY

In order to be successful in your course, you'll need to meet the minimum technology and system requirements; please refer to the [Technology and System Requirements](#) information. Additionally, students are required to have headphone speakers, microphone, or webcams compatible with their computer available to use for any online or hybrid classes. Please note that any course with online proctored exams require a computer with a camera (tablets are not compatible) to complete exams online.

Problems with technology do not relieve you of the responsibility of participating, turning in your assignments, or completing your class work.

FINAL EXAMINATION POLICY

Successful completion of this class requires taking the final examination **on its scheduled day**. No requests for early examinations or alternative days will be approved.

COURSE SCHEDULE AND ASSIGNMENTS

Week 1: The Growing role of Analytics in organizational life

Please watch: [The Ethics of Collecting Data](#)

Please read: [Tableau and Data Visualization](#)

Please read: [Understanding the Data Explosion](#)

Please read: [At UPS, the Algorithm Is the Driver](#)

Lecture: Data analytics can significantly change day to day business operations. The idea is that quantifiable information can make companies more effective and efficient. For example, UPS invested in a computer platform called Orion designed to follow a heuristic process to help drivers determine the best route. The model is complex and might involve a driver dropping off a package in the neighborhood only to return later in the day for further delivery. There's more than just the shortest most efficient route at stake. Customers expect stability. For example, a retailer might want packages delivered at a regular time each day. UPS also allows customers to enter preferences that can change the drivers' strategy during the day. HR departments are also using data analytics to treat workers like any other asset in the supply chain. The software collects information including email and calendars while maintaining anonymity to protect employee privacy. The data analytics provide real-time management consultations allowing for interventions on a continuous basis.

Companies also survey workers to determine workforce feelings. These changes in HR may lead to standalone data analytic divisions that function with HR, sales and information technology. There may be pitfalls to the technology. For example, some UPS drivers don't feel that Orion delivers on its promise. And making employees more efficient and happier won't necessarily make them more creative or innovative.

Business Application: What's the best way to achieve efficiency in the supply chain, distribution system or when managing people? That's the question increasingly answered with data analytics and software design to make companies more effective and efficient. The processes and systems may be very different ranging from Orion that routes deliveries that UPS to software that helps HR manage people. But the goal is the same. How do we run our business better using all the available data? At UPS the answer to that question is a routing system, Orion, which uses a heuristic process to create a route for each driver throughout the day. The route is not just a mathematical algorithm for the shortest distance between two deliveries. Orion also considers customer preferences, the need for consistency and stability in deliveries. People analytics used by HR tries

to both capture relationships to gain efficiency and provide a platform for feedback about worker perspectives on their job. The key issue is that as companies rely more and more on data and analytics; it won't just affect mechanical systems. Analytics will include everything from supply chains to distribution systems and management. The ability to develop, understand and interact with data analytics will be a key skill for future managers and employees.

Homework Questions (50 points):

1. Why can even a few pennies or dollars saved by individual drivers be significant to the overall financial performance of UPS?
2. Why are the kinds of decisions that UPS believes need to be made during the day as deliveries occur too complex for individual drivers? Illustrate your answer with examples from the article.
3. What is unique about Orion and how does that give UPS competitive advantage?
4. Evaluate the goal of people analytics.
5. Will people analytics necessarily create a better, more successful company?

Week 2: Big Data Collection and Ethics

Lecture: 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.

Readings:

1. Chapters 1 and 2 Data Analytics for Business Managers
2. Chapter 1 Storytelling with Data
3. Please watch the slide show and then follow the instructions to download Tableau: [Intro to Tableau](#)
4. Look over this [website at the WSJ](#) to see the fields you can use Data Analytics in:

Homework (50 Points)

Where are you on your Data Journey?

Math and Data Biography Exercise so I can better assist in our learning

Share your data journey until the present

1. List experience with math, data, research, and statistics as far as classes taken or interests. List experiences from all parts of your life (home, fun, volunteer, school, work, and research).
2. Which experiences were positive as far as subjects? What worked well for you?
3. Describe any challenges in your experiences.
4. How do you think enhanced data literacy can contribute to your career in business?
5. Key Takeaways you want me to know about how I can help you as a future executive manage data

Week 3:

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.

Read Chapters 3-6 of Data Analytics for Business Managers

And [Analytics at Google](#)

And this website – [Orienting Yourself in Tableau](#)

Homework (50 Points): [IBM and Twitter Forge Partnership on Data Analytics](#)

Summary: IBM and Twitter announced a far-reaching alliance to apply data from the microblogging service to solve business problems. The deal is designed to marry IBM's analytics software and large consulting staff with the huge volumes of information Twitter generates about users' action and opinions.

I like this article because it provides some explanation of how IBM plans to use the Twitter data, but leaves out some detail, thus giving room for students to develop their own ideas. The article describes different potential applications for Twitter data (e.g., customer service and support). Ask students to pick one of these potential applications, and describe in detail how a company, with IBM's help, could leverage Twitter data to solve a problem or pursue an opportunity in that particular area of application.

Questions:

- Explain the nature of the 'alliance' between Twitter and IBM. What is being exchanged, developed, or created as part of this alliance?
- What's an example of how Twitter data could be used to support an organization's customer service and support activities?
- How should Twitter price its data when it considers licensing those data for use by IBM and other companies?
- What are the career implications of Twitter's efforts to license its data for use by other companies?

Week 4:

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 as a way to structure data 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).

Read Ch 2 Storytelling with Data

Ch 7 and 8 of Data Analytics Basics for Managers

Connect with Data for Tableau

Homework (50 points):

Please go through each of the graphs listed at Storytelling with Data.

1. When are line graphs best?
2. What is a bar chart?
3. What is an area graph and what is it effective for?
4. What is a pie chart?
5. What is a scatter plot?

Week 5:

Predictive Analytics History & Current Advances

Though predictive analytics has been around for decades, it's a technology whose time has come. More and more organizations are turning to predictive analytics to increase their bottom line and competitive advantage. Why now?

- Growing volumes and types of data, and more interest in using data to produce valuable insights.
- Faster, cheaper computers.
- Easier-to-use software.
- Tougher economic conditions and a need for competitive differentiation.

With interactive and easy-to-use software becoming more prevalent, predictive analytics is no longer just the domain of mathematicians and statisticians. Business analysts and line-of-business experts are using these technologies as well.

Ch 3 Storytelling with Data

Ch 9 and 10 Data Analytics Basics for Managers

Tableau's Ask Data

Homework (50 Points)

Picking up from last week; Please go through each of the graphs listed at Storytelling with Data.

6. What is a slope graph?
7. What is a waterfall?
8. What is a data table?
9. What is a dot plot?
10. What is a bubble chart?
11. What is a spider chart?

Week 6:

Prescriptive Analytics: Prescriptive analytics is the process of using data to determine an optimal course of action. By considering all relevant factors, this type of analysis yields recommendations for next steps. Because of this, prescriptive analytics is a valuable tool for data-driven decision-making.

Machine-learning algorithms are often used in prescriptive analytics to parse through large amounts of data faster—and often more efficiently—than humans can. Using “if” and “else” statements, algorithms comb through data and make recommendations based on a specific combination of requirements. For instance, if at least 50 percent of customers in a dataset selected that they were “very unsatisfied” with your customer service team, the algorithm may recommend additional training.

It's important to note: While algorithms can provide data-informed recommendations, they can't replace human discernment. Prescriptive analytics is a tool to inform decisions and strategies and should be treated as such. Your judgment is valuable and necessary to provide context and guard rails to algorithmic outputs.

Read Chapters 11-14 of Data Analytics for Managers

Tableau – Which Chart is Right for You?

Homework (50)

Select an article from this WSJ website on [Artificial Intelligence](#) based on an area of your interest. Please summarize the article. How is AI being used? What did you learn about an application of Artificial Intelligence? What role do you think the human has based on the article?

Week 7:

Descriptive analytics is the process of using current and historical data to identify trends and relationships. It's sometimes called the simplest form of data analysis because it describes trends and relationships but doesn't dig deeper.

Descriptive analytics is relatively accessible and likely something your organization uses daily.

Basic statistical software, such as [Microsoft Excel](#) or [data visualization tools](#), such as Google Charts and Tableau, can help parse data, identify trends and relationships between variables, and visually display information.

Descriptive analytics is especially useful for communicating change over time and uses trends as a springboard for further analysis to [drive decision-making](#).

Lecture/Topics:

- Data collection
- Characteristics of Ideal Data
- Tidy data
- Connecting to Data in Tableau
- Preparing Data in Tableau

Readings:

- [Storytelling Chapter 4](#)
- [Data Analytics Chapter 15](#)
- [Tips for working with Data](#)
- [Tableau Data Interpreter](#)
- Structuring Data for Analysis (Tableau created PDF provided in Module folder)
- [Tableau Relationships](#)

Videos:

- [Getting started videos](#)
- [Connecting to Data videos](#)

Homework: Wall Street Journal Ethics and Data Short Case

Week 8:

Midterm in Class – Analytics Case Analysis

Week 9: Field and Variable Types for Data Visualization

Lecture/Topics:

- Categorical /Quantitative Variables from a Management Perspective
- Tableau Discrete/Continuous
- Tableau Dimensions/Measures
- Tableau Data Types
- Dates in Tableau
- Introduction to Maps

Exercise

- Name that variable game/activity

Readings:

- Chapter 5 Storytelling
- Chapter 16 Data Analytics
- Data Types
- Dimensions and Measures, Blue and Green
- Continuous Dates
- Confounding Variable

Videos:

- Getting started videos

Homework: HBS Innovation Design and Analytics Case
Week 10: Aggregations and Granularity

Lecture/Topics:

- Aggregation
- Granularity

Readings

- Data Aggregation in Tableau
- Aggregate functions in Tableau
- Structuring Data for Analysis (Tableau created PDF provided in Module folder)
- Chapter 6 Storytelling
- Chapter 17 Data Analytics

Videos:

- Aggregations, Granularity, and ratio calculations

Homework: HBS Short Analytics Case on Analytics in Retail

Week 11: Describing Distributions with Tableau

Lecture/Topics:

- Distributions
- Measuring Center
- Histograms
- Box Plots

Readings:

- Chapter 7 Storytelling
- Chapter 18 Data Analytics
- Build a histogram in Tableau
- reference lines, bands, distributions, and boxes
- Build a boxplot in tableau
- Analysis to a view in Tableau

Homework: WSJ Short Case Ethics of Big Data

Week 12: Regression Introduction and Significance for Prediction

Lecture/Topics:

- Scatter Plots
- Correlation

- Linear Regression

Readings:

- Chapter 8 Storytelling
- Chapter 19 Data Analytics
- Build Scatter Plot in Tableau
- Scatterplot and Aggregation
- Correlation Does Not Mean Causation
- MathisFun Correlation

Homework: HBS Short Case on Predictive Analytics as JetBlue
Week 13: Best Practices for Data Visualization

Lecture/Topic:

- Visualization best practices
- Introduction to Maps
- Deceptive Charts

Readings:

- Storytelling with Data, Chapter 9
- Chapter 20 Data Analytics
- Get Started Mapping with Tableau
- *Optional: Few and Knaflic on 100% stacked bar*

Videos:

- Cole Knaflic's talk at Google

Homework: HBS Analytics and Healthcare Short Case
Week 14: Storytelling with an A3 Format

Lecture/Topic:

- Data Storytelling Process
- Dashboards

Exercise:

- Dashboard Makeover demo

Readings:

- Storytelling with Data, chapter 10
- Andy Cotgreave post: [Ask Why](#)
- [Dashboards in Tableau](#)
- [Creating Defense Centric Tableau Dashboard](#)
- [SWD Choice Makeover](#)

Videos:

- [Cole Nuasbaumer Knaflic TC19 talk](#)

Homework: Create a Storyboard

Week 15: Last Class

Assignment in Class: Present Storyboard