



**Spring 2023**

<b>Meeting days:</b> Wednesday MV	<b>Instructor title and name:</b> Matt Boyne
<b>Meeting times:</b> 9:30 – 8:15	<b>Phone:</b> 760.715-8071
<b>Meeting location:</b> Mission Valley	<b>E-mail:</b> mboyne@pointloma.edu
<b>Final Exam:</b> May 3, 2023 Please adhere to University policy for the Final as listed below.	<b>Office location and hours:</b> M/F Fermanian 130 10:00-3:00
<b>Additional info: MV Office Hours 1230-4:30 After Class</b>	<b>Additional info: Call anytime</b>

**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 methods of applied data analysis, including capturing, identifying and analyzing data to inform decision making. Topics include an overview of statistical concepts, guidelines for effective data analysis, data visualization principles, and presenting and evaluating alternative solutions. Emphasis will be placed on designing and creating data visualizations to communicate with various stakeholders.

**COURSE LEARNING OUTCOMES-Note these need to be updated?**

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

1. Identify the processes and issues associated with research problem definition, research design, question, scale and survey design, sample design, data collection, data analysis, and writing and

presenting research methodology (PLO 1 & 6).

2. Determine an appropriate research methodology to achieve specific research objectives that includes quantitative and qualitative data collection/analysis techniques (PLO 3).
3. Analyze research projects to determine the appropriateness of methods (PLO 2).
4. Interpret the appropriate use of emerging business research methods (PLO 3).
5. Collaborate with a team to present current topics (PLO 6 & 7).

### **REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES (Have access to the books and your laptop for every class please)**

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1. [Course Pack for BUS 6025](#) available through PLNU's Bookstore (Type in SP 23, BUS 6025 and Section).
2. [Lean Analytics: Use Data to Build a Better Startup Fast](#). ISBN: 9781449335670. Note Library version, a PDF, will be available in class.
3. [Visual Analytics with Tableau](#). The text can be purchased from the publisher if you desire but is available for free from Ryan Library at <https://pointloma.on.worldcat.org/oclc/1096435960> . This site requires your PLNU login.
4. Tableau Desktop available for free as a student. You can acquire Tableau at <https://www.tableau.com/academic/students> . You will need Tableau as both the software and the elearning suite. The class will be "flipped" in the sense that outside lectures will come from Tableau while inside the class work will use Tableau, along with Excel, for practice and problems.
5. Laptops will be essential for each class, along with access to the texts either electronically or physically. Unfortunately if you are using a Chromebook, Tableau has very limited application.
6. Feeds/Blog Subscriptions that are useful to be aware of
  - a. [Viz of the Day](#) by Tableau Software
  - b. [The Functional Art](#) by Alberto Cairo
  - c. [Perceptual Edge](#) by Stephen Few
  - d. [Flowing Data](#) by Nathan Yau
  - e. [Storytelling with Data](#) by Cole Nussbaumer

### **ASSESSMENT AND GRADING**

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- **Exams are Open Book**
  - **All submitted homework and exams are to be an individual effort though group study is encouraged.**
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### **Professional Standards-We have to live by our values in our class performance:**

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- Punctuality. Is the student on time for every class showing the Fermanian Value of Commitment?
  - Attendance. Are the University's policies of absences and attendance adhered to?
  - Professionalism per Fermanian Values. Is the student engaged in the material, using electronic resources properly, fully present in the class, and contributing to the body of knowledge we are developing as a class?
  - Excellence per Fermanian Values. Are questions, comments, positions and effort in line with standards of Excellence as stated in the Fermanian Values?
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<ul style="list-style-type: none"> <li>• Leveling Module 50 Points/5%</li> <li>• Homework (9) 650 Points/65%</li> <li>• Midterm Exam 150 Points/15%</li> <li>• Final Exam 150 Points/ 15%</li> <li>• 1000 Points</li> </ul>	<p><u>Sample grade scale:</u></p> <table> <tr> <td>A=93-100</td> <td>C=73-76</td> </tr> <tr> <td>A-=92-90</td> <td>C-=70-72</td> </tr> <tr> <td>B+=87-89</td> <td>D+=67-69</td> </tr> <tr> <td>B=83-86</td> <td>D=63-66</td> </tr> <tr> <td>B-=80-82</td> <td>D-=60-62</td> </tr> <tr> <td>C+=77-79</td> <td>F=0-59</td> </tr> </table>	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
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B-=80-82	D-=60-62												
C+=77-79	F=0-59												

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### **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 work may be subject to a 25% penalty. Incompletes will only be assigned under extremely unusual circumstances.

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### **SPIRITUAL CARE**

PLNU strives to be a place where you grow as a whole person. To this end, we provide resources for our graduate 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](mailto:mvchaplain@pointloma.edu) or [gordonwong@pointloma.edu](mailto: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.

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### **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.

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### **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.

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## **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](mailto: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.

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## **SEXUAL MISCONDUCT AND DISCRIMINATION**

Point Loma Nazarene University faculty are committed to helping create a safe learning environment for all students. If you (or someone you know) have experienced any form of sexual discrimination or misconduct, including sexual assault, dating or domestic violence, or stalking, know that help and support are available through the Title IX Office at [pointloma.edu/Title-IX](http://pointloma.edu/Title-IX). Please be aware that under Title IX of the Education Amendments of 1972, it is required to disclose information about such misconduct to the Title IX Office.

If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact Counseling Services at [counselingservices@pointloma.edu](mailto:counselingservices@pointloma.edu) or find a list of campus pastors at [pointloma.edu/title-ix](http://pointloma.edu/title-ix)

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## **COURSE MODALITY DEFINITIONS**

- 1. In-Person:** Course meetings are face-to-face with no more than 25% online delivery.
  - 2. Online:** Coursework is completed 100% online and asynchronously.
  - 3. Online Synchronous:** Coursework is completed 100% online with required weekly online class meetings.
  - 4. Hybrid:** Courses that meet face-to-face with required online components.
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## **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 [Academic Policies](#) in the Graduate and Professional Studies Catalog for additional detail.

The second absence, other than University excused, may result in a 50 point, penalty, the third 100 points and the fourth 250 points. Please do not be late for class as a professional standard. Late arrivals can be considered absences.

## **FINAL EXAMINATION POLICY**

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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**

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### **Module 1 Statistics and Analytics Weeks 1 and 2**

Week of Jan 9<sup>th</sup>: The first module introduces key probability concepts that underpin most statistical and analytical methods. Without a strong foundation in the ideas of probability, randomness, and uncertainty, it is very difficult to truly understand and correctly apply most statistical inference methods. The normal distribution is the lynchpin to most of statistics through the central limit theorem, which underlies much of classical statistical methodology. When making decisions in an inherently uncertain world, the rules and laws of probability help provide support for addressing issues that arise from uncertainty.

As part of Module 1, please do the following:

#### **Quantitative Research Techniques and Statistics Course Assignment Leveling Module**

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You are required to take the Quantitative Research Techniques and Statistics course assignment leveling module. The time to complete the module is estimated at 6 to 9 hours, depending on your previous exposure to the subject.

To access the Quantitative Research Techniques and Statistics module, follow the on-screen instructions found at the following URL: <https://micro.peregrineacademics.com/pointloma>  
The password for the module is: PLNU-1001

If you have any problems with the registration process, please visit Peregrine's technical support page at: <http://www.peregrineacademics.com/support>

To successfully complete the module, you must earn a minimum score of 80% on the module post-test. You are allowed to attempt the post-test twice. If you have not achieved a passing score (80%) after two attempts, you will be required to purchase a new module for \$39.00 and continue attempts until a passing score is achieved at the same URL:

<https://micro.peregrineacademics.com/pointloma>  
The password for the retake module is: PLNUPAY-1001

If you take any modules that are not assigned to you for this course, you will be billed for each module at \$39. Modules should only be taken when assigned by the course and NOT earlier.

This module is worth 5% of your total course grade. The deadline for completing the module is January 22nd. The percentage earned on the leveling module post-test will be translated into points earned in this course as follows:

Post-test Percentage	Points Earned in Course
95.00-100	50
90-94.99	45
85.00-89.99	40
80.00-84.99	35
<80.00	0

Week 1 – 1/9 - There is no face-to-face class or Zoom session. Please work at your own pace but have the assignment completed by 5/15. Follow the directions for the Quantitative Research Techniques and Statistics Module Pre-Test. Get a notebook and pen so you are ready to take notes during the Pre-Test.

As you take the Pre-Test and come across terms that you do not know, need further explanation about, or require additional information stop and write out the term before you answer the question. Try to create a study plan of information you need to get a 100 on the test.

Then complete the Module...BUT don't take the Post-Test yet. See if you can answer your questions, if not do a general web search and answer the questions.

The first week's assignment is worth 50 points, or 5% of your grade. For each question or term you do not know research that term using the Module (without taking the post test) or a general web search, write out what the term or concept means. The submission will be a Word document with your name on it listing the term, the research's results and the source. Even if you got a 100 on the pretest please list anything that required greater explanation.

HW#1 Due 1/15 – Pre-Test Write Up 5% or 50 Points

Week 2 -1/18 – Introduction and Basic Statistics for Analytics

Statistical inference focuses on generalizing information from a sample to a population. Confidence intervals and hypothesis tests allow for using data to inform our understanding about the underlying process or population. The central limit theorem (CLT) forms the foundation of classical statistical methods when drawing inferences about both population means and population proportions. The goal of confidence intervals is estimating a range of reasonable values for the parameter, while hypothesis testing allows us to use data to examine the likelihood of a preconceived parameter value.

Introduce Analytics, our class syllabus and Class Guided readings on Chapter 4 in Course Pack in order to close any questions from the Pre-Test.

HW #2 1/22 – Post-Test Module for Statistics 5% or 50 Points

### **Module 2 Defining Analytics and Introducing Tableau (Week 3)**

Week 3 1/25 – Introduction to Analytics and Tableau

Business analytics is “the methodology of extracting information and knowledge from data that improves a company’s bottom line and enhances consumer experience.” The focus is on how the leader derives information from the data that can help the organization. The focus of the leader has shifted (somewhat) from ‘how can I get more, rich data?’ to ‘how can I use the myriad data I have to improve the business?’ To answer this question, a clear understanding of the data is key, as that will drive the methods applied.

In Class Guided Readings – Chapters 1 of Visual Analytics with Tableau (VAT) and the Course Pack; Please also read [Data Visualization with Tableau](#)

Learning Objectives:

- What does Data Literacy mean?
- What is Data Visualization?
- Define data and Data Analytics
- Data Driven Decision Making
- Stats Review for Module Post Test

After Class to Do-After getting the Free Student Edition of Tableau please complete the “Connect to and Customize Data” at <https://elearning.tableau.com/tableau-fundamentals>

### **Module 2 – Data Visualization Methods Using Excel and Tableau with Data Driven Decision Making (Week 4-8)**

This module focuses on descriptive analytics and the summarization of data both graphically and numerically. When discussing analytics in any context, communication is key and a “picture is worth a thousand words.” Distilling large amounts of data into clear summary statistics and graphics is a key step in communicating the story of the data. Translating data from its raw form into digestible content is key for any manager. This summarization via numerical and/or visual methods begins the journey of communicating numbers to the employee, follower, constituent, client, student, patient, etc. Visuals often make clear the various relationships among the variables, while the numerical summaries give objective information about the variables’ shape, center, and spread.

Week 4 2/1 – Visualizing Categorical and Numeric Values

In Class-Use Team Based Learning to apply basic analytics and visualization in a short case analysis. Guided readings Chapter 2 VAT and sections 3.1-3.3 from the Course Pack.

Learning Objectives:

- Types of Measures
- Introduction to Data Structuring
- Communicating with Data
- Connecting to Data with Tableau
- Introducing Excel as an Analytic Tool

After class to do-“Organize Data and Create Filters” <https://elearning.tableau.com/tableau-fundamentals>

Week 5 – 2/8 – Visualizing Summary Measures

Use team based learning to practice types of measures and apply in short cases. Discuss previous week’s work in application. Guided readings of Chapter 3.4-3.5 in the Course Pack and Chapter 3 Tableau.

Learning Objectives:

- Summary Measures with Excel and Tableau
- Keeping up with the Quants
- Analytics 3.0

After class to do – “Build Common Views” <https://elearning.tableau.com/tableau-fundamentals>

Week 6 2/15 – Practice Data Visualizations with Tableau and Excel

After class to do-“Map Geographic Data” <https://elearning.tableau.com/tableau-fundamentals>

Week 7 2/22 – Data Driven Decision Making

Data-driven decision making is the practice where data is collected, analyzed, and decisions are made based on the insights which are derived from the collected information. The process is more objective and can be quickly evaluated according to the influence of the data on metrics. Data-driven decision management is crucial for every organization regardless of sector. It helps the management to plan to see what will speed the operation to save time. Data based decision also helps to use past information to predict what is to happen in the future. Without data, there are a lot of risks, such as performing on false assumptions and being swayed by biases. The approach can be used by big businesses for big data analysis diagnostic modeling, and processing to enhance excellent performance. The success of data-based decision making depends on various factors. For example, the method that is used for data collection and the quality of the data. Data based decision management is heavily quantitative. It requires powerful, and enough, machines which are capable of computing and analyzing the big sets of data in the most efficient way.

There will be readings and notes through Canvas and [Tableau Data Driven Decision-Making](#). Chapter 6 VAT will be introduced for mapping methods

The class will practice on several data sets for data driven decisions in preparation for the Midterm in Week 8

After class to do-“Create Calculated Fields” <https://elearning.tableau.com/tableau-fundamentals>

Week 8 2/29 - Midterm in class, open book for 150 Points or 15%

After class to do-“Apply Table Calculations” <https://elearning.tableau.com/tableau-fundamentals>

## **Break March 6-12**

### **Module 4 Predictive Analytics (Weeks 9-12)**

Predictive Analytics relies on regression analysis. Regression is arguably the most common analytic technique used today. The goal has shifted from learning about a single variable to how multiple variables work together. Inferential goals remain (Does variable x impact or relate to variable y?), but goals of prediction (predictive analytics) are now introduced. The response variable is numerical, but the independent variables can be of any type. This module focuses on finding the line (plane) of best fit, evaluating the goodness-of-fit, testing significance, and ensuring the assumptions of the model are maintained. Regression analysis is the first ‘model building’ technique within the predictive analytics framework.

Week 9 3/15 – Regression Analysis Course Pack 5.1-.2

After class to do-“Apply Analytics” <https://elearning.tableau.com/tableau-fundamentals>

Week 10 3/22 – Regression Analysis Course Pack 5.3-.5

After class to do-“Work with Multiple Data Sources” <https://elearning.tableau.com/tableau-fundamentals>

Week 11 3/29 – VAT Chapter 7 Advanced Analytics

After class to do-“Create Dashboards and Stories” <https://elearning.tableau.com/tableau-fundamentals>

Week 12 – A Holy and Blessed Easter.

Week 13 4/12 – Dashboards Ch 8 VAT

After class to do-“Share and Publish Content” <https://elearning.tableau.com/tableau-fundamentals>

### **Module 5 Prescriptive Analytics (Weeks 14-15)**

The final piece of the analytics ‘puzzle’ is prescriptive analytics. Some people regard prescriptive analytics as a very broad term that encompasses all analytics techniques with an overall goal of improving business decision making. However, most people prefer making a distinction between

descriptive, predictive, and prescriptive analytics, where prescriptive analytics uses simulation and optimization algorithms to quantify the effect of different possible actions by a decision maker to help make a more informed decision. Prescriptive analytics focuses on decision making based on analytical models. Once the models have been built, tools like simulation allow for understanding the distribution of outcomes given the decision made by the company to allow for more goal-oriented decisions. Linear programming (as well as integer programming) is a constrained optimization technique in which allocation of limited resources can be distributed to optimize output. Prescriptive techniques are truly focused on understanding the implications of decisions and how to optimize decision-making.

Week 14 4/19 – Prescriptive Analytics Chapter 6. 1-.2 in Course Pack

Week 15 4/26– Prescriptive Analytics Chapter 6.3-.5 in Course Pack

Week 16 5/3 In Class Exam 15% 150 Points. Please adhere to University policy for the final.