

BUEC 29903

Business Analytics

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Class Location and Time: Morgan Hall 217 | 8:00am – 9:20am Tuesday/Thursday

Office Hours: Morgan Hall 207 | Tuesday 12:00pm – 4:00pm or by appointment

Email Hours: I respond to emails from 8:00am – 5:00pm EST, Monday – Friday.

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Course Description and Objectives

Business analytics is the study of statistical techniques used to make more informed business decisions. In this course, we will divide our time among three types of analytics: descriptive, predictive, and causal analytics. In the section on descriptive analytics, you will learn how to use tables and figures to describe data, in service of generating further questions and unlocking actionable insights. In our time examining predictive analytics, you will learn how to predict various outcomes and how to use those predictions to optimize business decisions. Our study on causal analytics will show you how to discover the causal factors impacting various aspects of a business.



By the end of the course, our shared goal is that everyone will meet the following learning objectives:

1. Generate questions where the answers provide value to a business and can be answered analytically.
2. Map business questions onto analytical techniques which can address the question.
3. Implement appropriate analytical techniques to answer the question.
4. Communicate the process and findings from the analysis and translate the findings into an actionable recommendation.

Materials

There is no textbook for the course; the only thing required for the class is a laptop. You will need to install Microsoft Excel, R, and RStudio for the course.

Grading

Category	Number	% Each	% Total
Course Participation	3	2	6
Quizzes	12	3	36
Mini-Projects	3	12	36
Final Project	1	22	22

Final grades will follow the traditional +/- scale: A = 93-100, A- = 90-92.99, B+ = 87-89.99, B = 83-86.99, B- = 80-82.99, C+ = 77-79.99, C = 73-76.99, C- = 70-72.99, D = 60-69.99, F = 59.99 and below. Final grades will be rounded up to the nearest whole integer based on standard rounding rules so that a 79.50% would be rounded to a 80% but a 79.49% would not be rounded up to an 80%.



Course Participation

For each of the full three months that the course takes place (September, October, November) you will be assessed on your participation, and you will have the opportunity to earn up to 2 percentage points each month. Good course participation is primarily characterized by three qualities: attendance, contribution, and focus. Regarding attendance, you will have one unexcused absence per month, no questions asked, no penalty. Any excess absences will result in an 0.25 percentage point reduction in your monthly course participation grade (e.g. if you miss two classes in the month of September, the maximum points you can earn in the month is 1.75 percentage points). Similarly, it is important that your attendance is prompt. You will have one unexcused late arrival per month. Excess late arrivals to class will result in a 0.10 percentage point reduction. The second characteristic of good course participation is contribution. You should aim to contribute at least once per week to the course discussion, and you should be an active participant in any group, in-class activities. Finally, is the characteristic of focus. Since this course involves R programming, you will have your laptops out during class. Any use of an electronic device (see “Course Policies” for more details) that violates the electronic device policy will result in a 0.10 percentage point reduction in your monthly course participation grade. Further, distracting behavior (such as talking with your neighbor while I am speaking) can result in a 0.10 percentage point reduction in your monthly course participation grade.

Quizzes

Quizzes will be taken in-class nearly every week. The quizzes will primarily test your ability to take business data and describe, in detail, how to correctly use the tools of analytics to address a given business problem. While given less emphasis, the quizzes will also test your coding abilities. The secondary emphasis on assessing your coding ability is due to the strong coding capabilities of artificial intelligence (AI) models, meaning that it is more important to know the approach you want to take than to remember every syntactic detail in a programming language. The quizzes will serve to ensure that you are internalizing the course material so that you will be prepared to work on projects.

Mini-Projects

One mini-project will be assigned for each of the three sections of the course (descriptive, predictive, and causal analytics). These projects are intended to simulate real-world business problems. You will be given a mixture of explicit instructions where you are told what analysis to undertake and more general instruction where you are told to accomplish a goal, but you will decide how to achieve that goal. You will be expected to utilize techniques and R functions that we have not explicitly covered during our class time together. The reason for asking you to go beyond what you have learned is that my intention is to teach you not only specific content, but the skill of how to learn new business analytic techniques with the help of R documentation and AI. You will be asked to apply this skill in the mini-projects.



Final Project

In the final project you will locate a dataset(s) related to a real-life business. Using the tools of business analytics, you will identify a potential business issue that the data can help solve. You may work on this project as an individual or in a group of a maximum of three persons.

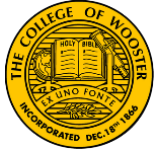
The project consists of two portions. First, is an .Rmarkdown report which frames the business problem you have identified and shows the code, with commentary and results, that addresses the business problem. You will submit your .Rmarkdown report twice but it will only be graded after the second submission. After the first submission, I will provide a score for your project as it stands and feedback on how you can improve. The second component of the project, is an approximately 20-minute (exact length will be determined based on the number of groups we have) presentation from the perspective of updating your company on your project and findings.

Course Schedule

The course is split into two sections

1. Descriptive Analytics
2. Predictive Analytics
 - a. Continuous Prediction
 - b. Categorical Classification
3. Causal Analytics

Wk.	Day	Date	Topic	Reading	Due
1	Thur.	Aug. 21	Introduction	<ul style="list-style-type: none">• What is Business Analytics?• The Anatomy of Data	
2	Tues.	Aug. 26	Descriptive Analytics	<ul style="list-style-type: none">• Descriptive Statistics in Excel	Quiz 1
	Thur.	Aug. 28		<ul style="list-style-type: none">• Data Visualization in Excel	
3	Tues.	Sept. 2	Descriptive Analytics	<ul style="list-style-type: none">• Introduction to R	Quiz 2
	Thur.	Sept. 4		<ul style="list-style-type: none">• Descriptive Statistics in R	
4	Tues.	Sept. 9	Descriptive Analytics	<ul style="list-style-type: none">• Data Visualizations in R	Quiz 3
	Thur.	Sept. 11		<ul style="list-style-type: none">• Data Visualizations in R	
5	Tues.	Sept. 16	Descriptive Analytics	<ul style="list-style-type: none">• Data Wrangling in R	Quiz 4
	Thur.	Sept. 18		<ul style="list-style-type: none">• Data Wrangling in R	
6	Tues.	Sept. 23	Continuous Prediction	<ul style="list-style-type: none">• Predictive Linear Regression	Quiz 5
	Thur.	Sept. 25		<ul style="list-style-type: none">• Predictive Linear Regression	Mini-Project 1
7	Tues.	Sept. 30	Continuous Prediction	<ul style="list-style-type: none">• Predictive Linear Regression	Quiz 6
	Thur.	Oct. 2		<ul style="list-style-type: none">• Predictive Linear Regression	
8	Tues.	Oct. 7	Fall Break		
	Thur.	Oct. 9			



9	Tues.	Oct. 14	Categorical Classification	• Logistic Regression	Quiz 7
	Thur.	Oct. 16		• Logistic Regression	
10	Tues.	Oct. 21	Text Analytics	• Text Analytics	
	Thur.	Oct. 23		• Text Analytics	
11	Tues.	Oct. 28	Continuous Prediction	• LASSO Regression	Quiz 8
	Thur.	Oct. 30		• LASSO Regression	
12	Tues.	Nov. 4	Causal Analytics	• A/B Testing	Quiz 9
	Thur.	Nov. 6		• Difference-in-Differences	Mini-Project 2
13	Tues.	Nov. 11	Causal Analytics	• Difference-in-Differences	Quiz 10
	Thur.	Nov. 13		• Difference-in-Differences	
14	Tues.	Nov. 18	Causal Analytics	• Difference-in-Differences	
	Thur.	Nov. 20		• Pricing Analytics	
15	Tues.	Nov. 25	Thanksgiving Break		
	Thur.	Nov. 27			
16	Tues.	Dec. 2	Categorical Classification	• Neural Networks	Quiz 11
	Thur.	Dec. 4		• Neural Networks	Quiz 12 Mini-Project 3
Tuesday, Dec. 9 8:00-10:30am			Final Project Presentations		Final Project

Course Policies

Attendance Policy

Per the college's policy, attendance of less than 75% of classes will result in a "D" being your maximum grade in the course. Your attendance will also be assessed in your "Course Participation" grade. What is the purpose of education?

Electronic Device Policy

Given the use of R programming in the course, you are encouraged to use your laptop in class to write down code and take notes. Any use of your laptop for activity not related to class will be considered a violation of our electronic device policy. Any use of a cell phone, for any reason, will be considered a violation of our electronic device policy.

Late Assignments

Unless otherwise communicated, assignments will be due at the beginning of class. Every day an assignment is late, a 3-percentage point penalty will be assessed with the maximum penalty being a 40-percentage point penalty. For example, if you turn in an assignment two days late, then you would have a 6-percentage point penalty assessed.



Artificial Intelligence (AI) Usage

You are permitted to use AI¹ in this course, except during quizzes. When using AI in an assignment, you must put a section at the beginning of your assignment entitled: “AI Acknowledgement” where you describe what AI you used and how you used it. Although the use of AI is unrestricted in this course, you should primarily be using AI to help you with coding and debugging questions as you will be responsible for describing, without the help of AI, how to approach business analytics problems in the quizzes.

Academic Honesty

Academic honesty is a key value in this class and in the College. Violations of academic honesty as discussed in The Scot’s Key include “turning in another person’s work as your own, copying from any source without proper citation, violating expectations for a group project, submitting an assignment produced for a course to a second course without the authorization of all the instructors, and dishonesty in connection with your academic work.” Please refer to [The Scot’s Key](#) for more details on the Code of Academic Integrity.

Course Withdrawal

Please visit the registrar’s website for information on [academic deadlines](#) and for the [relevant online forms](#).

Support Services

As your instructor, I am your first line of support for all things related to this course. Yet, the College of Wooster offers many wonderful services that can help you in this course and more generally during your time at Wooster. I have compiled a list of some of these resources, which I encourage you to utilize.

Mental Well-Being

Being a student can feel overwhelming at times. To help with this, I have designed my course using [trauma-informed teaching principles](#). In times of struggle you are encouraged to seek support at The Longbrake Student Wellness Center which offers [counseling services](#) that provide a safe, confidential, nonjudgmental space where students can explore a wide variety of issues and concerns.

¹ Including, but not limited to: ChatGPT, Claude, and Gemini.



Academic Resource Center



Students with diagnosed disabilities are encouraged to contact the [Academic Resource Center](#) (ARC) to secure accommodations. Please speak with me if you will be arranging accommodations with the ARC so that I can know how to support you. The ARC also offers support in the areas of time management techniques, class preparation tips, test taking strategies, English language learning, and peer-tutoring. You can schedule an appointment [here](#).

The Writing Center

The [Writing Center](#) is the place for you to go if you are looking for feedback, help, or someone to talk about a writing project you are working on. Writing Center consultants can help with everything from brainstorming and outlining to major revisions and minor edits.

***Disclaimer:** Course policies, grading, and the schedule of the course can be adjusted at my discretion. The syllabus is simply meant to provide you a general outline of what you can expect from the course and what I expect of you.