

## **COURSE SYLLABUS: Business Analytics I (DRAFT)**

GSCM 571 (CRN 44742)

Winter 2020, Fully Online

### **Broad Course Trajectory**

This course will introduce students to key analytic methods dealing with statistics, probability, and forecasting. By the end of the course, students will be able to understand and employ common analytical methods themselves as well as being well-informed customers of more advanced analytics teams in their organizations. Methods will be explored each week through readings and videos, with assigned problems, online discussions, a midterm exam, and the option to finish the course with a mini-project or a final exam. The programming language, R, will be the tool of choice for this course though some work can be completed in Microsoft Excel, and Python will be supported.

### **Instructor Information**

Dale Frakes, PhD Student & Adjunct Instructor Systems Science/School of Business Administration

Office Hours: online by arrangement

Email: [dfrakes@pdx.edu](mailto:dfrakes@pdx.edu)

This course is a fully-online course and is accessible at the [TODO: INSERT D2L Course Link] site. If you have any difficulty with [D2L](#) or with entering the course or with please contact the [OIT Helpdesk](#).

For personal questions or issues specific to you, email is the quickest way to reach me. Please put the course number into your subject line for a faster response. I am also happy to arrange an appointment at your convenience.

I strive to reply to emails within 24 hours, and usually more quickly. I will use D2L discussion boards for public communications and an @pdx.edu email addresses for private communications. D2L will also be used for submitting assignments and posting required discussion items. Messages sent to the instructor's D2L email are forwarded. If the instructor replies to such messages, the replies will go to the student's D2L email unless the student has forwarded their D2L emails to their preferred email account. Students must also monitor their regular @pdx email account and the D2L course website. If @pdx email is not a preferred email account, students should consider forwarding @pdx email to an account they routinely check.

For questions about the course, post them in the "General Questions" discussion forum. A peer may be able to quickly answer your question. I will also reply in the forum so that the entire class can benefit.

Note: Please be aware that this syllabus is considered a live document. As we progress through the term, greater detail will be added about various projects. This information will also be shared on your weekly content pages and via announcements as it becomes available. I highly recommend selecting your preferred notification settings to receive alerts for newly available materials.

### **Prerequisites**

Graduate Student standing in the Global Supply Chain Management Program or Systems Science Program.

## Course Objectives

- Develop an understanding of common statistical analysis and data science methods so they can be used in the student's professional practice
- Enable the student to be informed customers of analytics/data-science professionals and teams in their organizations
- Learn how to use the R programming environment to perform data analysis

## Academic Connections of This Course

GSCM 571 is one of the optional courses you can use towards the completion of a [Masters degree](#) in the Global Supply Chain Management Program. This course may also be used towards other degrees; please consult the [SBA Department website](#) and your advisor to learn more.

## Texts

### Required/Highly Recommended:

The texts for this course are available in physical hard-copy as well as freely available online PDFs or web-pages. The following texts are required in the sense that we'll have assigned readings and problems from them. Students are not required to use the hard-copy versions.

- OpenIntro Statistics, 4<sup>th</sup> Edition (2019) by David Diez, Mine Çetinkaya-Rundel, and Christopher D Barr, ISBN 978-1943450077, <https://www.openintro.org/stat/textbook.php>
- Statistics Done Wrong, 1<sup>st</sup> Edition (2015) by Alex Reinhart, ISBN 9781593276201, <https://www.statisticsonewrong.com/>
- Forecasting Principles and Practice by Rob J Hyndman & George Athanasopoulos, ISBN 978-0987507112, <https://otexts.org/fpp2/>

### Optional:

A majority of the work can be done in Excel, we'll be focusing on using R for the statistical work, with support for using Python. For those interested in R, the following texts may be interesting and helpful (but entirely optional):

- Discovering Statistics Using R, Andy Field: <https://www.discoveringstatistics.com/>
- The Art of R Programming, Norman Matloff: <https://nostarch.com/artofr.htm>
- R In Action, Robert I. Kabacoff: <https://www.manning.com/books/r-in-action>

Additional resources will be suggested throughout the term.

## Technology Requirements

### Computer/Software:

Access to a reliable computer with high speed Internet, video/audio streaming capability, Adobe PDF reader, R & RStudio, and MS Suite is a required component of this course. At the beginning of the course, you are expected to identify at least two alternative places where you can obtain wired, high-speed Internet access in the event of loss of access at your primary location. Examples are at home, work, PSU computer labs, public libraries, home of a friend or family member, etc. (Please note, you may need a wired connection in order to complete online tests for some courses).

### Internet Browser:

The latest version of Chrome, Firefox, IE, or Safari (please note - the recommended browser(s) may change, depending upon the tool/application.)

### Zoom Meetings:

[TODO: update to zoom]

Some courses may require you to either attend synchronous sessions or connect with classmates via [Google groups](#) to collaborate and do team class activities. Consult with your instructor, the course website and the course syllabus to determine if and when hangouts and other Google Apps might be used in the course. [PSU OIT](#) will support assisting students with technical problems involving Google hangouts and other Google apps. Google also provides [tutorials](#) to help you get started.

### Other Essential Devices:

A web camera, microphone and headset (your computer may already have these).

### Please note:

Additional specialized software or subscriptions may be required to complete work or fully participate in this course. Please review the Technology Requirements and Resources page [[LINK TO D2L Course Page](#)] and this syllabus for any unique requirements.

Visit [Course Technology Information](#) to verify that your system is capable of using the technology tools required for this course. If you cannot purchase the necessary equipment, consider [borrowing from the PSU library](#).

## Assignments & Grading

This course is graded as 4 credits, A-F. Analytics is a topic that's best learned by doing. So in addition to watching videos and reading assigned readings, there are a number of required assignments. The grading of the assignments has been set up to accommodate different learning styles as well as to provide flexibility to work around the demanding schedule of the professional student.

Graded activities are generally due on Sunday evenings at 11:59PM, PSU local time (see the course calendar for specific dates and times).

### Graded Activities

The tables below show the graded activities for the course. There are two groups of graded activities: Graded and Flexible.

The Required Items include the intro discussion, midterm exam, group session #3, and either a Mini-Project or Final Exam. It totals 50 points of the 100 for the class total. Within the Required Items, one source of flexibility is in the choice between doing a *Final-Exam* or a *Mini-Project*. That decision should be made after taking the midterm exam.

Required Grade Items	Points
Introduction Discussion	5
Midterm Exam	15
Group Session #3	5
Mini-Project OR Final Exam	25
<b>TOTAL:</b>	<b>50</b>

The Flexible Items include everything else. These items are structured so students can choose which and how many of each item to complete in order to accumulate the points required to achieve the remaining 50 points of the course total. The main flexibility is among the *Weekly Assignments*, *Online Discussions*, and *Synchronous Hangouts*. If schedule or personal preference makes it difficult to participate in all of *Online Discussions* or *Hangouts*, points could be made up by completing 7 or 8 *Assignments* instead of the planned 6.

Flexible Grade Items	Number Avail	Suggested	Points Each	Points	Max Points
<b>Weekly Assignments</b>	7	5	5	25	35
<b>Online Discussions</b>	6	4	5	20	30
<b>Group Sessions 1 &amp; 2</b>	2	1	5	5	10
<b>TOTAL:</b>				50	(50 of 75)

The table above shows that there are 75 points worth of activities in the Flexible Items group. Students can choose any number of these activities to get up to 50 points towards the total grade. Note: here is a maximum of 50 points available in the Flexible Items group – so additional points here cannot make up for points lost in the Required Items group.

The total grade is the sum of points from each group and the grade is assigned as shown in the table below.

### Grading Scale

Letter Grade	Points
<b>A</b>	94 – 100
<b>A-</b>	90 – 93.99
<b>B+</b>	87 – 89.99
<b>B</b>	84 – 86.99
<b>B-</b>	80 – 83.99
<b>C</b>	Below 80

### Explanation of Graded Activities

#### *Weekly Assignments*

Each week a number of problems will be assigned from the textbook or other sources. There are two components of submitting assignments. The first component is submitting the final answers for the problems under a “quiz” item in D2L. This will give immediate feedback on the correctness of your answers. You can submit this as many times as you like until the due date. The best score of all your submissions will be taken.

The second component is to submit scans of worked problems, Excel sheets, and/or R programs to a designated assignments folder, also on D2L. The items submitted here will not be evaluated for accuracy but only that they represent an adequate effort to solve the problems. Upon request, I’ll be happy to take a closer look at this portion of the submission and provide feedback.

There will be 7 opportunities to submit assignments, but only 5 are generally required to achieve full points for the course.

### ***Online Discussions***

In 7 of the weeks, there will be a prompt in the Discussion area of D2L. The grading on these is a bit subjective but I'm looking for posts and responses that reflect some effort, particularly ones that encourage ongoing discussion for the class. To get the full 5 points, I am looking for two *effortful* posts; one that responds to the prompt and another that responds to another's post or asks an engaging question.

There will be 7 opportunities to participate in the online discussions, but only 5 are generally required to achieve full points for the course.

### ***Synchronous Group Meetings***

[TODO: update to zoom]

During this term we will meet 3 times via Google hangout. Please pick a slot that would work for your schedule and stay with it throughout this term.

- Google Hangout #1: \_\_\_\_\_ Monday or \_\_\_\_\_ Wednesday
- Google Hangout #2: \_\_\_\_\_ Monday or \_\_\_\_\_ Wednesday
- Google Hangout #3: \_\_\_\_\_ Monday or \_\_\_\_\_ Wednesday

Due to the Google hangout technology limitation, I will limit each hangout session to 20 students. Please complete the D2L survey with your top 2 slot choices based on the following Google hangout schedule by Sunday evening of the first week.

- Slot #1: \_\_\_\_\_ Monday 5– 6 p.m. PST
- Slot #2: \_\_\_\_\_ Wednesday 4– 5 p.m. PST
- Slot #3: \_\_\_\_\_ Monday 6:30– 8:00 p.m. PST

### ***Midterm Exam***

There is one midterm exam worth 22% of the grade for the class. It will operate like the assignments in that there will be questions to be worked out by hand, with Excel, or with R/RStudio. The answers will then be entered under a "quiz" in D2L for grading. The quiz will provide the questions and will allow a generous 3 hours to work on the problems and submit answers (unlike the Assignments, you only have one opportunity to submit your answers; you cannot re-take the quiz to resubmit your answers). This will account for 50% of the grade for the exam. Then scans of hand-work, the Excel sheets, and or R/RStudio code used to solve the problems will need to be submitted in the Assignment folder for the Midterm; this will account for the other 50% of the grade for the midterm and must be submitted within 1 hour of the "quiz" submission for credit. These should demonstrate the work you did to come up with the answers you submitted. This submission will also offer the opportunity for me to award partial credit for problems that did not receive full points in the quiz submission.

During the week of the exam, the quiz and assignment folder will be made available Friday at 12:01AM and will remain open for 9 days, closing on Sunday at 11:59PM (plan accordingly that both parts are submitted by the deadline).

### ***Final Exam***

If a student does not opt to do a Mini-Project then they should take the Final Exam.

The Final Exam is worth 33% of the grade for the class. It will operate just like the Midterm Exam with problems provided and answers to be submitted for grading in a D2L quiz within a 3 hour window. And as with the Midterm, scans of hand-work, the Excel sheets, and or R/RStudio code used to solve the problems will need to be submitted in the Assignment folder for the Final Exam within 1 hour of completing the quiz portion. These should demonstrate the work you did to come up with the answers you submitted. This submission will also offer the opportunity for me to award partial credit for problems that did not receive full points in the quiz submission.

During the week of the exam, the quiz and assignment folder will be made available Friday at 12:01AM and will remain open for 8 days, closing on Saturday at 11:59PM (plan accordingly that both parts are submitted by the deadline).

All material from the class may appear on the final, including material from before the Midterm Exam.

### **Mini-Project**

Students may choose to do a Mini-Project instead of the Final Exam (but not both). It too is worth 33% of the grade.

The idea here is to creatively pursue a problem of interest, using the tools and techniques learned in the course. There are 3 deliverables related to the Mini-Project:

- Short 1-2 paragraph project proposal, submitted in week 5 (20%)
- Presentation (during the last Google Hangouts session) (35%)
- Full write-up, submitted during Finals week (45%)

It's difficult to define the scope for a mini-project but I'm looking for something that can be completed with 15-25 hours of effort over the 5 weeks available to work on it. The proposal should include a problem statement covering the analytic question to be explored, possible methods to analyze it, data sources, and expected outcome. The presentation should be a handful of slides or similar material that can be presented to the class in 5-7 minutes. The write-up will preferably be an R-Markdown document including discussion, the analytical methods used, analysis of the methods, and discussion of the results. Including images and charts, this will probably be in the range of 10-15 pages. I will be grading on the quality of the work, not on the final outcome of the analysis. That is, if your stated goal was to *demonstrate X*, and carefully done analysis fails to do this, I will be grading the analysis and not the failure to *demonstrate X*.

As a fallback, students have until the week before Finals week to decide if they wish to complete their project or switch to taking the Final Exam.

### **Course Outline**

Week	Topic	Class Activities	Assignments, Exams, etc.
1	Introduction: Analytics as a process and product, R & RStudio. Overview of data and methods.	Discussion 1	Install R/RStudio, post "hello world"
2	Exploring Data: Distributions of Single Variables, Relationships among variables	Discussion 2	Assignment 1

<b>3</b>	Probability & Distributions; Normal, Binomial, Poisson, Exponential	Discussion 3	Assignment 2
<b>4</b>	Sampling, Sampling Distributions, Confidence Intervals	Google Hangout #1	Assignment 3
<b>5</b>	Hypothesis Testing	Discussion 4	Assignment 4
<b>6</b>	Midterm Prep		Midterm Exam, Mini-Project Proposal
<b>7</b>	Regression Analysis: Estimating Relationships and Statistical Inference	Google Hangout #2, Discussion 5	Assignment 5
<b>8</b>	Forecasting & Time Series Analysis	Discussion 6	Assignment 6
<b>9</b>	Logistic Regression (binary and categorical variables)	Discussion 7	Assignment 7
<b>10</b>	Machine Learning & AI	Google Hangout #3	Mini-Project Presentation
<b>11/Finals</b>	Final Exam or Project Write-up		Final Exam, Mini-Project Writeup

### Accommodations for Learning Differences

If you have, or think you may have, a disability that may affect your work in this class, [register your needs](#) with the [Disability Resource Center \(DRC\)](#) to initiate an accommodations support process. The DRC can be reached at (503) 725-4150 or [drc@pdx.edu](mailto:drc@pdx.edu). Once you have coordinated with the DRC, please contact me to make sure that I have received a faculty notification letter and we can discuss your needs for the term.

PSU values diversity and inclusion; we are committed to fostering mutual respect and full participation for all students. My goal is to create a learning environment that is equitable, usable, inclusive, and welcoming. If any aspects of instruction or course design result in barriers to your inclusion or learning, please notify me.

### Academic Integrity

Review the [Student Conduct Code](#) to become familiar with your rights, responsibilities and the behaviors for which a student may be subject to disciplinary action. An act of academic dishonesty (e.g., cheating, [plagiarism](#), misrepresenting or improper/no citing that leads the instructor/viewer of content to believe that the writing and content are original to you, or unauthorized possession of examinations will automatically result in a grade of "F" for the affected assignment, and the case will be referred to university authorities. University authorities have the ability to escalate matters to the level of expulsion. Make sure you keep electronic copies of all your assignments also outside of D2L so that you can produce them should the need arise.

Many of PSU's online courses use the [Turnitin plagiarism assessment tool](#) to evaluate assignments. This tool checks submissions against a database of published works, as well as other students' papers. You can review your Turnitin report before submitting an assignment and make necessary revisions. If you are still unclear as to what constitutes plagiarism, please review the [PSU Library's Citation Tutorial](#).



## Data Privacy

The Family Educational Rights and Privacy Act (FERPA) is a federal law that affords students certain rights with respect to their academic records, such as “the right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent.” FERPA protects students from having their information disseminated to third parties without consent.

In accordance with this law, Portland State University has adopted rules to govern the gathering, use, and disclosure of student records with the aim of guaranteeing the privacy of such records. Under the Student Record rules, most of the records that the University maintains with regard to a student can only be disclosed to the student, University officials, sponsors of disbursed financial aid, or government agencies upon receipt of lawful subpoenas.

## Online Proctoring and Data Privacy

Portland State University's School of Business uses an automated, third party, remote proctoring service to monitor and regulate student behavior during online exams. The current service employed—Proctorio—never holds unencrypted academic records. All data that enters its system has been encrypted by PSU's learning management system (LMS) according to user roles, and can only be unlocked by authorized instructors and campus administrators within the LMS. This restricts information from being shared with users who do not possess a PSU "School Official" role, preventing unauthorized individuals and Proctorio from accessing student data.

- Proctorio delivers all content via SSL (TLS 1.2), and their servers are compliant to PCI and HIPAA standards. Cookies used by the Services cannot be used to personally identify you.
- Proctorio never requests disclosure of PII. When going through technical support channels, representatives see student inquiries as unique, randomized identifiers according to institution. The service is accessible through PSU's LMS, with costs assumed by The School of Business, meaning no secondary accounts or payment information.
- Proctorio is a Chrome extension that requires activation in order run within a section. This service only operates on specified quiz pages within the LMS.

## Title IX Reporting Policy

As an instructor, one of my responsibilities is to help create a safe learning environment for my students and for the campus as a whole. We expect a culture of professionalism and mutual respect in our department and class. You may report any incident of discrimination or discriminatory harassment, including sexual harassment, to either the [Office of Equity and Compliance](#) or [the Office of the Dean of Student Life](#).

Please be aware that as a faculty member, I have the responsibility to report any instances of sexual harassment, sexual violence and/or other forms of prohibited discrimination. If preferred, you can instead share information about sexual harassment or sexual violence with a [confidential employee](#) who does not have this reporting responsibility. These include:

- Women's Resource Center (503-725-5672)
- Queer Resource Center (503-725-9742)
- Center for Student Health and Counseling (SHAC): 1880 SW 6th Ave, (503) 725-2800
- Student Legal Services: 1825 SW Broadway, (SMSU) M343, (503) 725-4556



## Safe Campus Module

Portland State University desires to create a safe campus for our students. As part of that mission, PSU requires all students to take the learning module entitled *Creating a Safe Campus: Preventing Gender Discrimination, Sexual Harassment, Sexual Misconduct and Sexual Assault*. For more information about Title IX, please complete the required student module [Creating a Safe Campus](#) in D2L.

If you or someone you know has been harassed or assaulted, you can find the appropriate resources on PSU's Enrollment Management & Student Affairs: Sexual Prevention & Response website at <http://www.pdx.edu/sexual-assault>.