THE OHIO STATE UNIVERSITY
FISHER COLLEGE OF BUSINESS

BUSML 4382 – Logistics & Supply Chain Analytics

Semester:
Spring 2023

Classroom:
Schoenbaum (SB) 215 (M & W)
Schoenbaum (SB) 219 (F)

Zoom Meeting ID:
614 292 0568; PW: buckeyes
Direct link:
go.osu.edu/zoom_with_dr_castillo

Instructor: Dr. Vince Castillo

E-mail: Castillo.230@osu.edu

Student Hours: To be determined via poll on day 1
Always held in person or via Zoom
Additional appointment requests are always welcome

Office: Fisher Hall 532

Course Content Website: http://carmen.osu.edu/

Class Meeting Times:

Section	Time	M	W	F
4275	11:30a-12:25p	Lecture (SB215)	Lecture (SB215)	Lab (SB219)
4669	12:40p-1:35p	Lecture (SB215)	Lecture (SB215)	Lab (SB219)

Course Description:
This course introduces students to the tools necessary to understand, analyze, and make decisions in logistics and supply chain management (LSCM). We will study foundational classes of analytics methods (i.e., descriptive, predictive, and prescriptive) in detail to understand how they are used to evaluate and enhance understanding of common LSCM problems. Specifically, we're going to study data visualization, time series forecasting, fundamental machine learning methods, inventory management, transportation planning, and network design problems. By the end of the course, you should be familiar with common analytical modeling tools and how to use them to make the "business case." This course will enhance your analytical thinking, that is, the process of transforming a real-world LSCM problem into a mathematical one.

Mode of Delivery:
We will meet on Mondays and Wednesdays for lectures in SB215. These lectures will cover of the theory behind the methods along with discussion of the benefits and drawbacks when they're used in LSCM. On Fridays, we will have lab sessions in SB219. Labs will typically consist of a period of practical instruction on the analytics methods covered that week with an emphasis on managerial interpretation of the results.

Required Materials and Technology:

- A subscription to a generative AI service that enables access to the **GPT-4** large language model (LLM). Recommended models (in order of compatibility with this course) with their prices as of the writing of this document:
    1. **ChatGPT Plus by OpenAI ($20/month) → You will not be able to access the virtual tutor without this.**
    2. Perplexity.AI ($20/month)
    3. Microsoft Bing (Free, but its focus on web searching can be troublesome)
    4. Github Copilot (Free for students, but hasn't been tested for the course content; contact me if you want to use this option)
    5. Check with me before considering other options
- The course reader that explains all content covered in this course is provided on Carmen.
    1. This document is provided freely to students enrolled in this course for your educational purposes.
    2. Unauthorized public distribution of this document, including uploading to cheating websites such as (but not limited to) Chegg, CourseHero, or StudyBlue, constitutes a *violation of the university's copyright policy*.
- You also need a laptop or desktop computer with a working webcam and microphone along with a reliable internet connection. Please ensure that you have Zoom updated. Please ensure that you have MS Excel

installed to your desktop (I advise using the desktop application as opposed to using it through MS Teams or your web browser, both of which have limited functionality).

- You will need two software packages in addition to standard Microsoft Office programs. We will learn to use **RStudio** to do data visualization and machine learning. You can download it for free for Windows, Mac, or Linux by following this link. It is also installed on the computers in the SB219 and Mason Hall labs. I strongly recommend installing RStudio and not just R.
- In the latter half of the course, we will learn to use AnyLogistix (ALX) for supply chain design and network optimization. You can download the Personal Learning Edition from the ALX website by clicking on the link above and creating a free account. This is available for both Windows and Mac (sorry, Linux users).

Evaluation Criteria:

Graded Components	% of Total	Type
Individual Assignments (2 ea.)	15%	O
Group Case Studies (3 ea.)	40%	C
Exams (3 ea.)	45%	N

(Assignment Details are posted to Carmen)

Requirements for each form of graded component.
Failing to follow these will represent academic misconduct. See below.

Independent Work [N]: Strictly non-collaborative, original individual work. You may discuss this assignment with your instructor only. Discussions with other individuals, either in person or electronically, are strictly prohibited.

Collaboration Required [C]: An explicit expectation for collaboration among students either in class or outside of class (i.e. group work).

Collaboration Optional [O]: Students are permitted, but not required, to discuss the assignment or ideas with each other. However, all submitted work must be one's original and individual creation.

Academic Conduct:
If a student is suspected of, or reported to have committed, academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct (COAM). If you have questions about the above policy or what constitutes academic misconduct in this course, please contact me. See OSU Prohibited Conduct – Section 3335-23-04(A)

University Policies, Services and Resources (go.osu.edu/UPolicies)

Fisher Undergraduate Handbook and QuickLinks (www.bsbalinks.com)

Fisher Navigator Resource Portal (www.nav-1.com)

Assignments and Grading:
All assignments will be distributed and submitted via Carmen. Assignment details, explanations, and grading criteria are posted under 'Assignments' on Carmen. Grades will be posted on Carmen as soon as I finish grading your submissions (usually within a week). I will gladly review any grades I give during student hours or via appointment.

Late Assignment Policy:

- **One-Time No-Questions-Asked Late Submission**
  - You are allowed to submit one assignment up to 24 hours late without any questions asked. To exercise this option, please inform me **before the original due date** of the assignment. A simple email stating, *"I wish to exercise my late submission option for [assignment name]"* will suffice.
- **Late Penalty**
  - When you exercise the one-time no-questions-asked late submission option, you gain an additional 24 hours beyond the original due date to submit your assignment with no consequences. However, if you are late in submitting by this extended due date, a 20% penalty will be applied. This penalty will continuously accrue for each 24-hour period beyond the extended due date. If you have not notified me of your choice to exercise this option by the original due date or if you have previously exercised your one-time no-questions-asked late submission option, then the 20% penalty will be applied for each 24-hour period beyond the original due date.

Grading Scale:
The following table is used to assign final course grades. The value in the bottom row is the cutoff value to earn the next higher letter grade shown on the top row (e.g., 90% is the cutoff for an A-). The middle row is how many grade points are provided for said letter grade. I do not round grades, so 89.51 is a B+.

Letter (Points)	A (4.0)	A- (3.7)	B+ (3.3)	B (3.0)	B- (2.7)	C+ (2.3)	C (2.0)	C- (1.7)	D+ (1.3)	D (1.0)	E (0.0)
Range	100% - 93%	- 90%	- 87%	- 83%	- 80%	- 77%	- 73%	- 70%	- 67%	- 60%	- 0%

Above percentages are % of overall points earned. Final grades will be determined at the end of the term. The Fisher College of Business requires core specialization courses to be designed such that final class average GPA falls between 2.8 and 3.3.

Policy on Generative Artificial Intelligence:

This course presents opportunities to use generative AI tools such as ChatGPT, Perplexity, Microsoft Bing, Github Copilot, Pi.ai, Poe, Claude, Gemini, or others on assignments. Like most technological innovations in life, these tools can be used responsibly or unethically. I will not explicitly prohibit their use in this course. On the contrary, we will learn to use generative AI to construct analytics models. Furthermore, I do require that we maintain an open dialogue regarding your use of these tools in the classroom. **To that end, I ask that you declare on any submission whether you used one of these tools to develop the submission and, if so, how you employed it. The omission of such a statement will result in a loss of points on the final grade of that assignment.** For most assignments, I will require that you use generative AI and attach your prompts with responses as an appendix to your submission. Being transparent about how you're using generative AI in this course serves two purposes. It discourages misuse of these tools, and it also provides evidence that what you've submitted is your own, original work.

With this in mind, I encourage you to view generative AI as a "writing partner" or a "coding partner." Use it to brainstorm ideas during the writing process or even evaluate your writing exposition once you've written a draft. Use it to generate code and Excel formulas needed to run certain analyses or create desired visualizations. **However, you should know that these tools are still rife with factual inaccuracy, outright false claims, and plagiarism. When using generative AI tools, you must mitigate the risk of factual inaccuracy, falsification, and plagiarism appearing in your work.** This means fact-checking any claims made by the AI and writing passages using your own cognition and creativity.

Allowing the tools to generate written content (i.e. narratives or executive summaries) you then try to submit as your original work violates the Ohio State Academic Integrity Policy. You are responsible for the integrity of your submissions. Per the university's Academic Integrity Policy, if I *suspect* academic misconduct has occurred, I am obligated to report my suspicions to the Committee on Academic Misconduct (COAM), as outlined above. If you have any questions about this policy, please contact me for clarification *before* you use any of these tools.

The bottom line is that I encourage (and in some cases, require) you to use generative AI but we must learn to use it responsibly and transparently. Anything you submit is assumed to be your own original work, and any evidence to the contrary will be reported to COAM.

You are responsible for what you submit.

Assignment Requirements when Using Generative AI

- Your header or title page **must** include the statement, "*I/We have/have not completed this assignment with the assistance of Generative AI.*"
- When applicable, you must include a citation in your reference list showing which generative AI you've used.
- To show how you used generative for the assignment, include a link to your thread as part of the citation in the reference list or attach a printout of the conversation thread as an appendix. For example, if you used both ChatGPT and Perplexity, your reference list should include the following entries:
    - "Title of your thread." ChatGPT by OpenAI. Accessed [Date you accessed the content]. https://chat.openai.com/share/84d41409-896c-4730-94ce-ca2d5bc78410.
    - "Title of your thread." Perplexity AI. Accessed [Date you accessed the content]. https://www.perplexity.ai/search/This-is-an-He1kkd95Q_G18W21zb_88w?s=c.
- These declarations are required for anything you submit in this course. Omitting them will result in points deducted from your final grade on the assignment.

Attendance / Participation Expectations:
I will not be monitoring attendance nor does your grade include a participation component. However, you should plan on attending each class session, since we cover a lot of material in a short period of time. I understand that extenuating circumstances occasionally arise which may affect your ability to be in class. Courtesy emails are appreciated in such cases, but not necessary (unless it potentially conflicts with an exam as stated above). I will still hold you accountable for the content covered in those sessions, so if you need to miss a class you should 1) review the slides and associated reading to ensure you can follow along; 2) contact a classmate to ask for a copy of their notes (and perhaps buy them a coffee in exchange); then 3) make an appointment with me to ask specific questions remaining from the lectures/labs.

In rare but extreme situations, I may have to enforce University rule 3335-8-33, which states that any student may be disenrolled from a course for failure to attend by the first Friday of the term, or by the 3rd instructional day of the term, or by the second class meeting, whichever occurs first.

Course-specific Copyright Policy:
Material provided by the instructor may not be re-posted anywhere without the explicit permission of instructors. See University Copyright Policy.

Accommodations due to COVID or Other Medical-Related Absences:
The university strives to make all learning experiences as accessible as possible. In light of the COVID pandemic, students seeking to request COVID-related accommodations may do so through the university's request process, managed by Student Life Disability Services. If you anticipate or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Additional Learning Accommodations:
The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, please make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion.

SLDS Contact Information: slds@osu.edu; 614-292-3307; slds.osu.edu;

SLDS Office: 098 Baker Hall, 113 W. 12th Avenue.

Mental Health Resiliency:
As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614-292--5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614-292-5766 and 24 hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-800-273-TALK or at suicidepreventionlifeline.org.

Syllabus or Course Policy Changes:
Instructor reserves the right to change any policies in this syllabus or the course as necessary. Such changes will be communicated in class and posted as an announcement on Carmen.

Course Schedule:

Disclaimer – In the event that extenuating circumstances arise necessitating a change to the course schedule, policies, or other content, I will clearly communicate those changes by explaining them in class and posting an announcement to Carmen.

Date	Day of the Week	Location	Description	Required Pre-Reading
01/08/2024	Monday	SB215	Course Introduction	
01/10/2024	Wednesday	SB215	Making the Business Case with Analytics Introduction to Descriptive Analytics	Section 1.1, 2.1, 2.2
01/12/2024	Friday	SB219	Data Visualization with Excel	Section 2.2
01/15/2024	Monday		Martin Luther King Jr. Day (no lecture)	
01/17/2024	Wednesday	SB215	Descriptive statistics Introduction to Generative AI	Section 2.2; Appendix A
01/19/2024	Friday	SB219	Introduction to R Data Visualization with Generative AI	Section 2.2; Appendix A
01/22/2024	Monday	SB215	Introduction to Predictive Analytics Forecasting Introduction	Section 3.1, 3.2.1, 3.2.3
01/24/2024	Wednesday	SB215	Times Series Forecasting	Section 3.2.3
01/26/2024	Friday	SB219	Optimizing ES Forecasts with Excel	Section 3.2.4
01/29/2024	Monday	SB215	Measuring Forecast Fit	Section 3.2.4
01/31/2024	Wednesday	SB215	Double and Triple ES Forecasts	Section 3.2.5
02/02/2024	Friday	SB219	Optimizing Double and Triple ES Forecasts	Section 3.2.5
02/05/2024	Monday	SB215	Exam 1 Review	
02/07/2024	Wednesday	SB215	Exam 1	
02/09/2024	Friday	SB219	Forecasting Case Study Lab Time	
02/12/2024	Monday	SB215	Introduction to Machine Learning	Section 3.3, 3.3.1, 3.3.2
02/14/2024	Wednesday	SB215	ML with Linear Regression	Section 3.3.3
02/16/2024	Friday	SB219	ML with R	Section 3.3.3
02/19/2024	Monday	SB215	ML with Linear Regression	Section 3.3.4
02/21/2024	Wednesday	SB215	ML with Linear Regression	Section 3.3.4
02/23/2024	Friday	SB219	ML Case Study Lab Time	Section 3.3.4
02/26/2024	Monday	SB215	Introduction to Prescriptive Analytics Optimization	Section 4.1, 4.2.1
02/28/2024	Wednesday	SB215	Linear Programming	Section 4.2.1.1 - 4.2.1.6
03/01/2024	Friday	SB219	Solving LPs in Excel	Section 4.2.1.1 - 4.2.1.6

03/04/2024	Monday	SB215	LP Examples	Section 4.2.1.1 - 4.2.1.6
03/06/2024	Wednesday	SB215	Exam 2 Review	
03/08/2024	Friday	SB219	Exam 2	
03/11/2024	Monday		Spring Break (no lecture)	
03/13/2024	Wednesday		Spring Break (no lecture)	
03/15/2024	Friday		Spring Break (no lab)	
03/18/2024	Monday	SB215	Integer Programming	Section 4.2.1.7 - 4.2.1.9
03/20/2024	Wednesday	SB215	Integer Programming Examples	Section 4.2.1.7 - 4.2.1.9
03/22/2024	Friday	SB219	LP/IP Case Study Lab Time	Section 4.2.1.7 - 4.2.1.9
03/25/2024	Monday	SB215	Heuristics - Vehicle Routing	Section 4.2.2
03/27/2024	Wednesday	SB215	ORION at UPS	Section 4.2.4
03/29/2024	Friday	SB219	Vehicle Routing with Generative AI	Section 4.2.4
04/01/2024	Monday	SB215	Simulation Modeling	Section 2.3
04/03/2024	Wednesday	SB215	Simulation Modeling	Section 2.3
04/05/2024	Friday	SB219	Simulation Modeling	Section 2.3
04/08/2024	Monday	SB219	Exam 3 Review	
04/10/2024	Wednesday	SB219	Exam 3	
04/12/2024	Friday	Virtual Lab	Introduction to ALX	Section 4.2.5, ALX Reference Material
04/15/2024	Monday	SB219	Supply Chain Network Design	
04/17/2024	Wednesday	SB219	Supply Chain Network Design	
04/19/2024	Friday	SB219	Supply Chain Network Design	
04/22/2024	Monday	SB219	Supply Chain Network Design	