



DSO-510: Business Analytics

Term: FALL 2023

Units: 3.0

Day and Time: Sections 372-16324R and 16325D (Sat 9:00 am-11:50 am);
Starting Aug 26

Location: ONLINE - Zoom Meeting Link in Blackboard

Professor: Tathagata 'Das' Dasgupta, PhD

Office Hours: By appointment

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Instructional Assistant: TBD

Email: TBD

I. Course Description

Business analytics is the process of utilizing tools and techniques to turn data into meaningful business insights. This course provides students with a foundational knowledge of business analytics, including strategies, methods, and tools. Students will obtain the necessary skills for defining business analytics for data-driven decision-making and innovation and hands-on experience using analytics to solve real-world problems. While this course exposes students to various analytics tools, the focal objective is to provide a managerial perspective on the usage and role of business analytics in progressive corporations.

This course will help students obtain a managerial perspective on the applications of analytics across various domains. Importantly, this course focuses on the process of defining a business problem, breaking it down into concrete hypotheses, translating these hypotheses into an analytically solvable question, conducting analysis, and then translating data analytics into meaningful business insights and outcomes. We will cover four major modules:

- 1) Defining Business Problems and Obtaining and Organizing Data
- 2) Descriptive Analytics and Visualization
- 3) Predictive Analytics, and
- 4) Prescriptive Analytics.

PRE-REQUISITES:

1. Good proficiency in Microsoft Excel (if you wish to use R or Python, you can skip this)
2. PC is preferred, since an Excel Add-On, Analytic Solver (from Frontline Systems), performs better on PC than MAC
3. Intermediate level of Statistics (Probability, Inference, Hypothesis Testing)

II. Course Definition (for Course Catalog)

Foundational knowledge of business analytics, including strategies, methods, and tools integrated with hands-on skills for defining business analytics for data-driven decision-making and innovation.

III. Learning Objectives

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

- Describe business analytics and the required skills, methods, tools, and resources.
- Explain how leading companies use business analytics in multiple major functional areas of an organization.
- Use an overall business analytics framework and several techniques and tools to implement strategies and approaches for business analytics.
- Define, perform, and present business analytics for data-driven decision-making and innovation.

IV. Course Format

Classes include a mixture of lectures, demonstrations, and discussions. Students are expected to come to class prepared to discuss the readings and apply the business analytics knowledge and skills they learn in class to projects. Students are encouraged to collaborate with others on their projects to foster ideas and get feedback for improvements.

V. Software

Students are free to use a programming language of their choice to solve the problems we discuss in this course. You can use a combination of Excel, Python, R (<http://cran.r-project.org>), Rstudio, <https://rstudio.com/>, a free GNU-license statistical package, and Tableau, <https://www.tableau.com/>.

This course will be entirely taught using Excel with an Analytic Solver Add-In module, and it not teach how to write R and Python programs; it would be about real-life business problems and cases where the instructor will share how these problems are solved in business and assign homework for you to use your problem-solving expertise. The focus of grading would be how you approached the problem and what results with 'actionable insights' you come up with. If you have Excel use or other programming questions, the Instructional Assistant will be happy to assist you.

VI. Course Grading

Assessment	% of Grade
Homework	15%
Midterm	25%
Participation	10%
Project	25%
Final Exam	25%

VII. Case Write-ups Homework Assignments

Students are required to analyze data and write a one-two page case analysis. There will be 3 homework assignments. Guidelines will be provided during class. Each is worth 5%.

VIII. Class Participation

Class sessions will provide helpful information for learning the topics covered in the course and working on the Project. Student participation in class discussions is crucial because it introduces alternative viewpoints and helps clarify concepts for the class. Participation grades will be based on the quality of a student's contribution to the lectures. The final participation grade will be determined solely at the discretion of the instructor. 10%

Class Participation—Behavioral Anchor Rating Scale:

Excellent Performance

- Initiates information relative to topics discussed.
- Accurately exhibits knowledge of assignment content.
- Clarifies points that others may not understand.
- Share personal experiences or opinions related to the topic.
- Offers relevant/succinct input to the class.
- Actively participates in-class exercises.
- Demonstrates ability to apply, analyze, evaluate & synthesize course material.
- Demonstrates willingness to attempt to answer unpopular questions.
- Builds on other students' contributions.

Average Performance

- Participates in group discussions when asked.
- Demonstrates knowledge of course material.
- Offers clear, concise, "good" information on class assignments.
- Offers input, but tends to reiterate the intuitive
- Attends class regularly.

Unacceptable Performance

- Fails to participate even when directly asked.
- Gives no input to discussions.
- Does not demonstrate knowledge of the readings.
- Shows up to class: does nothing.
- Distracts group/class.
- Irrelevant discussion

IX. Exams

There will be a midterm and a final exam. Each is worth 25%. All questions would be problems to be solved during the exam.

X. Group Project

A detailed explanation of the Project will be posted on Blackboard. You will be assigned to a group of four to six students to work together on a real-world problem with the approval of the instructor. Students are expected to contribute to the completion of the team project in this course substantially. The following outlines the project phases and their associated percentages:

- 1) Define the business problem and outline the business insights to be obtained. Submit a two-page summary of the problem and why it is crucial. Outline the data sources that will be used to answer this problem.
- 2) Collect data and combine/query data for the insights prescribed in part 1, provide where data was obtained from, and the dataset in CSV format.
- 3) Prepare descriptive analytics on the data and visualizations. Discuss the tools used to answer the research question and obtain feedback from classmates and the instructor before conducting the final analysis.
- 4) Final presentation and project submission. Present findings to the class and discuss the methodology and business insights obtained. Project submission should have a summary of findings and analysis. It should be clear and concise. Submissions that are not clear and/or difficult to understand will be penalized. All code and statistical analysis must also be submitted.
- 5) Describe the process of working in a team and the roles of each group member. Also, describe if you would change any aspect of your business analysis project after the presentation.

Assignment Submission Policy

All content submissions will be submitted through Blackboard. Late submissions will be penalized by 5% per day. We pay a lot of attention to 'group contribution so that there are no free riders. Below is a sample peer evaluation form.

XI. Required Readings and Supplementary Materials

- **Journal Articles:** Available for free through the USC libraries.
(<http://libguides.usc.edu/go.php?c=9231877>).
- **Business Cases and Articles:** HBR Course pack can be found here:
<https://hbsp.harvard.edu/import/1071514>
- **Text Book from McGraw Hill: [Business Analytics: 2nd Edition](#)**
By Sanjiv Jaggia and Alison Kelly and Kevin Lertwachara and Leida Chen
ISBN10: **1264302800**
ISBN13: **9781264302802**
Copyright: 2023
You can purchase an electronic version of the textbook and/or hard copy from the McGraw-Hill Web site, Amazon, or any other sources.

XII. Course Communication

Course communication occurs through posting class materials into Blackboard (<http://blackboard.usc.edu>), email, and announcements in class.

XIII. Course Schedule: A Weekly Breakdown of the Syllabus, note that it is subject to change.

	Topics/Daily Activities	Readings and Homework	Deliverable/ Due Dates
Week 1 – Aug 26	Introduction to Business Analytics	Big Data: The Management Revolution. Harvard Business Review	
Week 2 – Sep 2	Problem-Solving Approach and Formulation in Business Analytics Chapter 15	Emerging Trends in Business Analytics. Communications of the ACM.	
Week 3 – Sep 9	Exploratory Data Analysis (EDA): Chapters 2 and 3	Data Analytics from Bias to Better Decisions. Rotman Management Magazine.	
Week 4 – Sep 16	Descriptive Analytics Review of Probability Theory and Probability Distribution Concepts Chapter 5	Integrating Analytics in Your Organization: Lessons from the Sports Industry. MIT Sloan Management Review.	HW1 (EDA)
Week 5 – Sep 23	Descriptive Analytics Probability Distributions and Confidence Intervals Chapter 6	How a German Manufacturing Company Set Up Its Analytics Lab. Harvard Business Review Better People Analytics. Harvard Business Review	
Week 6 – Sep 30	Descriptive Analytics Statistical Hypothesis testing Chapter 6 (continued)	Where Predictive Analytics Is Having the Biggest Impact. Harvard Business Review.	
Week 7 – Oct 7	Predictive Analytics Regression Analysis Chapters 7 and 8	Analytics Concepts Every Manager Should Understand. Harvard Business Review Digital Articles	HW2 (Probability, Inference, Hypothesis testing)
Week 8 – Oct 14	MIDTERM (5 hrs)		

Week 9 – Oct 21	Supervised Data Mining K-NN and Naïve Bayes Algorithms	Your Biggest Social Media Fans Might Not Be Your Best Customers. Harvard Business Review Digital Articles.	
Week 10 – Oct 28	Descriptive Analytics Unsupervised Data Mining Hierarchical Clusters K-Means Clustering Chapter 14	The Use of Observational Technology to Study In-Store Behavior: Consumer Choice, Video Surveillance, and Retail Analytics. Article: The Behavior Analyst.	HW 3 Predictive Analytics with Regression and Supervised Learning
Week 11 – Nov 4	Predictive Analytics Time Series Forecasting Chapter 10	Common Mistakes that Can Derail Your Team's Predictive Analytics Efforts. Harvard Business Review.	
Week 12 – Nov 11	Prescriptive Analytics Optimization Chapter 17, 18	The Path to Prescription: Closing the Gap Between the Promise and the Reality of Big Data. Rotman Management Magazine	HW 4 (Unsupervised and Time Series)
Week 13 – Nov 18	Prescriptive Analytics Simulation Chapter 16		
NOV 25	THANKSGIVING BREAK		
Week 14 – Dec 2	PROJECT PRESENTATIONS DUE HW 5 due Optimization and Simulation		
Week 15 – Dec 9	FINAL EXAM (5 hrs)		

OPEN EXPRESSION AND RESPECT FOR ALL

An important goal of the educational experience at USC Marshall is to be exposed to and discuss diverse, thought-provoking, and sometimes controversial ideas that challenge one's beliefs. In this course, we will support the values articulated in the USC Marshall "[Open Expression Statement](#)."

Statement on Academic Integrity

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. *SCampus*, the Student Guidebook, (www.usc.edu/scampus or <http://scampus.usc.edu>) contains the University Student Conduct Code (see University Governance, Section 11.00), while the recommended sanctions are located in Appendix A.

Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: <http://www.usc.edu/student-affairs/SJACS/>. Failure to adhere to the academic conduct standards set forth by these guidelines and our programs will not be tolerated by the USC Marshall community and can lead to dismissal.

Synchronous Sessions

To earn full participation points, students must actively participate in all synchronous sessions via computer or laptop, with a webcam and headset/speakers. You are expected to be in a location with a reliable internet connection and without distractions. You need to be able to fully engage at all times. Students are expected to be visually present and to ask thought-provoking questions, offer relevant comments, and answer questions from faculty clearly and concisely. If the class meets at a time outside of 7:00 am to 10:00 pm in the time zone, please consider registering for a section that meets then. If you are unable to do this, please contact your professor immediately. As outlined in the student handbook, there are specific expectations of a student attending class online. When attending, present and act appropriately as if you were in a physical classroom.

Please do:

- Attend class from a quiet area, free of distractions.
- Dress respectfully. Video conference business meetings are and will be the norm, so practice your professional telepresence.
- If you use a virtual background, please keep it respectfully professional.
- Display both your first and last name during video conferencing and Synchronous class meetings.
- Respectfully minimize distractions by muting and or turning the video off when moving around
- Engage in appropriate tone and language with instructors or classmates.
- Disagree respectfully.
- Respectfully pay attention to classmates

Please do not:

- Engage in a simultaneous activity (e.g., using a telephone, reading a book, knitting)
- Interact with people who are not part of the class.
- Leave frequently or not be on camera for extended periods of time.
- Have other people or pets in view of the camera.
- Behave in an overtly inattentive manner (looking distracted, not participating)

Asynchronous Activities – Discussion Boards and emails

Our discussion boards are ways for you to share your ideas and learn with your colleagues in this class. We do this as colleagues in learning, and the Discussion Board is meant to be a safe and respectful environment for us to conduct these discussions.

Some Netiquette Rules:

- Engage in appropriate tone and language with instructors or classmates.
- Disagree respectfully.
- Do not use all CAPITAL LETTERS in emails or discussion board postings. This is considered "shouting" and is seen as impolite or aggressive.
- Do not use more than one punctuation mark, this is also considered aggressive!!!!
- Begin communications with a professional salutation (Examples: Dr. Name; Ms. Name; Hello Professor Name; Good afternoon Mr. Name). Starting without a salutation or a simple "Hey" is not appropriate.
- When sending an email, please include a detailed subject line. Additionally, make sure you reference the course number (Ex. BUAD101 in the message and sign the mail with your name).
- Use proper grammar, spelling, punctuation, and capitalization. Text messaging language is not acceptable. You are practicing your role as a business leader.
- Re-Read, think, and edit your message before you click "Send/Submit/Post.". As a check, consider whether you would be comfortable with your email or post, or text being widely distributed on the Internet.

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on [Research and Scholarship Misconduct](#).

Students and Disability Accommodations:

USC welcomes students with disabilities into all the University’s educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodation is not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call
studenthealth.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call
suicidepreventionlifeline.org

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call
studenthealth.usc.edu/sexual-assault

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - (213) 740-5086
eetix.usc.edu

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298
usc-advocate.symplicity.com/care_report

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - (213) 740-0776
osas.usc.edu

OSAS ensures equal access for students with disabilities by providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

USC Campus Support and Intervention - (213) 821-4710
campussupport.usc.edu

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity, and Inclusion - (213) 740-2101
diversity.usc.edu

Information on events, programs, and training, the Provost’s Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call
dps.usc.edu, emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call
dps.usc.edu

Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)
ombuds.usc.edu

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

Occupational Therapy Faculty Practice - (323) 442-3340 or otfp@med.usc.edu
chan.usc.edu/otfp

Confidential Lifestyle Redesign services for USC students to support health-promoting habits and routines that enhance the quality of life and academic performance.