

USC Marshall

School of Business

GSBA 524 – Data Science for Business (for all cores) Spring Term 2024-25

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COURSE DESCRIPTION

Today, the spread of "Big Data" is fundamentally reshaping the business landscape. Strategic decisions within organizations increasingly rely on rigorous statistical analysis, while data-driven models play a pivotal role in shaping effective business strategies. Modern data sets gather a wealth of critical information, ranging from company performance metrics and randomized marketing campaign outcomes to individual customer behavior tracking and macroeconomic indicators. This course aims to equip both present and future managers with the quantitative skills needed to proficiently navigate our data-rich business world, facilitating the application of sound statistical reasoning for leading successful modern enterprises.

The first half of GSBA 524 integrates domain-specific intuition with foundational statistical concepts, guiding students in extractive business insights from data through descriptive statistics, graphical exploration, probability distributions, point estimation, confidence intervals, and hypothesis testing.

The second half of GSBA 524 focuses on building predictive models to meet various business needs. It provides a comprehensive understanding of correlation and regression techniques. Key topics include evaluation of regression models, nuanced interpretation of the regression model outputs, scrutiny of underlying assumptions, and strategies to address deviations from these assumptions.

COURSE OBJECTIVES

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

1. Perform basic data analysis and understand analyses performed by others (e.g., consultants).
2. Select and use the appropriate statistical techniques for analyzing data.
3. Systematically formulate and build multiple regression models for business applications.
4. Apply sound statistical reasoning to make data-driven decision-making.
5. Think critically about business data to make informed decisions under uncertainty.

COURSE MATERIALS

The following items will be necessary for completion of reading assignments and homework.

- **Class videos and podcasts.** This is a partially flipped class. Reading material and introductory recordings for each topic will be posted in Brightspace. Each week, students are expected to study the content indicated on Brightspace and take a quiz. Some assignments must be completed before class, while others may also be completed after, as specified on Brightspace.
- **Class notes.** Notes and slides for this class will be available on Brightspace. Students should familiarize themselves with these notes before they are covered in class.
- **Optional textbook.** Please note that the textbook is recommended but not required.

GSBA-524, Data Science for Business

ISBN13 978-0134497167

Title Statistics for Business: Decision Making and Analysis, 3rd edition

Author Robert Stine and Dean Foster

Publisher Pearson

SOFTWARE – JMP – Refer to for Instructions to download JMP 17

Instructions on how to download JMP are provided on Brightspace. You can also find instructions on the USC ITS website, which you can find by looking up “USC JMP” on Google.

You will be using JMP software to describe and analyze data. You will find the JMP software manual quite useful. JMP resembles a spreadsheet in some ways but has many specialized graphical features not found in Excel; working with JMP17 will help you to do Visual Analytics for other courses.

The JMP Manual will be used as a reference for using the JMP software and for its descriptions and discussions of statistical concepts. Note: There is both a Windows and a Mac version of the software.

If you have any questions or need assistance with the Course Pages, please contact the Marshall HelpDesk at 213-740-3000 or HelpDesk@marshall.usc.edu.

----- Why JMP -----

JMP (pronounced “jump”) is statistical software made by SAS that enables users to easily explore and visualize data using a variety of tools for statistical analysis and interactive graphing.

JMP can be used for research, development, and quality control applications and includes analytics for Six Sigma® and the design of experiments.

Why use JMP?

While JMP is capable of advanced analytics, the software assumes that the user only has a very basic background in statistics. Therefore, it is an ideal statistics package for students. JMP assists the user in choosing correct analytic procedures and in interpreting results.

COURSE FORMAT

This course is taught in a partially flipped format. All materials can be found in Brightspace (<https://brightspace.usc.edu>). The course is divided into modules. Module activities may include reading assignments, weekly lessons, videos and podcasts, interactive exercises, homework assignments, discussion forums, class sessions, and quizzes or exams. It is expected that students complete all required activities and assignments *before* attending their class session for each week.

Students should ensure that they could access all of the online tools via Brightspace prior to the start of classes.

Zoom is the platform used for online office hours. A link and instructions to join the Zoom sessions will be posted in the Brightspace Course Pages.

EMAIL POLICY

Email: Students are kindly asked to follow the email protocol described below, which is useful to reduce response times and ensure effective administration of the class.

- **Use your USC email only.** External emails are often blocked by the spam system.
- **The subject should start with “GSBA 524”.** For example: “GSBA 524 - question about p-values”. Emails whose subject follows this format will be automatically placed in a special folder of the instructor’s mailbox that receives high priority. Messages that do not follow this format are more likely to get lost.
- If you don’t receive a response within 2 business days, please email again.
- If you email a grader, please CC the instructor.

PARTICIPATION POLICY

In-person class attendance and active participation are essential components of this course. Students are expected to attend all classes. Students are allowed to miss one class in the event of unforeseen circumstances, and they should notify the instructor in advance. Class recordings will be posted in Brightspace within 24 hours of the live class.

GRADING

Grades will be determined by the scores obtained in the homework assignments, quizzes, team project, midterm exam, and final exam. Letter grades will only be assigned at the end of the course.

Homework. There will be three group homework assignments. Students can work on these assignment in groups of up to 3 people, but each student should submit their own assignment on Brightspace.

Team project. Students will work with their core team to complete the team project. The project will involve applying multiple regression models to a business problem and then writing an executive summary. At the end of this assignment, each student will complete a peer assessment questionnaire and rate all team members based on their individual level of contribution and participation.

Exams. The midterm and final exam are open-book and will be delivered on Brightspace in class. Students will need to bring their laptop to do this exam. Students will be allowed to use a calculator and the JMP software, but they will not be allowed to communicate with anyone during the exam. Phones will not be allowed. No student can be exempted from either exam. No alternative dates nor make-up exams can be offered.

| Assignments | % of Overall Grade | Collaboration policy |
|----------------------|--------------------|--|
| Quizzes | 10% | Individual submission. |
| Homework assignments | 20% | Individual submissions, but work can be completed in groups of up to 3 students. |
| Team project | 10% | Individual submissions, but work should be completed together by core teams. |
| Midterm exam | 20% | Individual exam. |
| Final exam | 40% | Individual exam. |

FEEDBACK

The instructor welcomes constructive student feedback throughout the course. Further, the student course evaluations are also valuable. This course is continuously improved, based on feedback from students and instructor observations.

AI USAGE POLICY

No AI usage permitted. Since creative, analytical, and critical thinking skills are part of the learning outcomes of this course, all assignments should be completed by the students working individually or in groups. Students may not have another person or entity complete any substantive portion of any assignment. Developing strong competencies in these areas will prepare you for a competitive workplace. Therefore, using AI-generated tools is prohibited in this course. Any unauthorized use of AI tools will be considered plagiarism, and will be reported to the Office of Academic Integrity.

| COURSE OUTLINE AND ASSIGNMENTS – Tuesday Core - Schedule | | | |
|---|--|--|--------------------------|
| | Topics | Pre-lecture assignments | Deliverable due |
| Tue 01/14/25 Module 1 | Course intro, data, types of variables, descriptive statistics, data visualization, empirical rule, JMP. | Videos, podcasts, and reading material indicated on Brightspace. | Quiz 1. |
| Tue 01/21/25 Module 2 | Sampling, random variables, normal distribution. | Videos, podcasts, and reading material indicated on Brightspace. | Quiz 2. Homework 1. |
| Tue 01/28/25 Module 3 | Logic of hypothesis testing, testing for proportion, testing a mean. | Videos, podcasts, and reading material indicated on Brightspace. | Quiz 3 |
| Tue 02/04/25 Module 4 | Confidence intervals. Review. | Videos, podcasts, and reading material indicated on Brightspace. | Quiz 4 |
| Tue 02/11/25 Midterm Exam Module 5 | Midterm Exam (1 hour) Correlation and covariance. | Videos, podcasts, and reading material indicated on Brightspace. | Quiz 5. Homework 2. |
| Tue 02/18/25 Module 6 | Simple linear regression. Multiple linear regression. | Videos, podcasts, and reading material indicated on Brightspace. | Quiz 6. |
| Tue 02/25/25 Module 7 | Residual analysis. Collinearity, indicator variables, higher-order terms, interactions. | Videos, podcasts, and reading material indicated on Brightspace. | Quiz 7. Homework 3. |
| Tue 03/04/25 Module 8 | Remaining topics. Review. | Videos, podcasts, and reading material indicated on Brightspace. | Quiz 8. Team project. |
| Tue 03/11/25 Final Exam | Final Exam (2 hours) | | |

COURSE OUTLINE AND ASSIGNMENTS – Saturday Core - Schedule

| | Topics | Pre-lecture assignments | Deliverable due |
|--|--|--|--------------------------|
| Sat 01/11/25 Module 1 | Course intro, data, types of variables, descriptive statistics, data visualization, empirical rule, JMP. | Videos, podcasts, and reading material indicated on Brightspace. | Quiz 1. |
| Sat 01/18/25 Module 2 | Sampling, random variables, normal distribution. | Videos, podcasts, and reading material indicated on Brightspace. | Quiz 2. Homework 1. |
| Sat 01/25/25 Module 3 | Logic of hypothesis testing, testing for proportion, testing a mean. | Videos, podcasts, and reading material indicated on Brightspace. | Quiz 3 |
| Sat 02/01/25 Module 4 | Confidence intervals. Review. | Videos, podcasts, and reading material indicated on Brightspace. | Quiz 4 |
| Sat 02/08/25 Midterm Exam Module 5 | Midterm Exam (1 hour) Correlation and covariance. | Videos, podcasts, and reading material indicated on Brightspace. | Quiz 5. Homework 2. |
| Sat 02/15/25 Module 6 | Simple linear regression. Multiple linear regression. | Videos, podcasts, and reading material indicated on Brightspace. | Quiz 6. |
| Sat 02/22/25 Module 7 | Residual analysis. Collinearity, indicator variables, higher-order terms, interactions. | Videos, podcasts, and reading material indicated on Brightspace. | Quiz 7. Homework 3. |
| Sat 03/01/25 Module 8 | Remaining topics. Review. | Videos, podcasts, and reading material indicated on Brightspace. | Quiz 8. Team project. |
| Sat 03/08/25 Final Exam | Final Exam (2 hours) | | |

Note: There are no in-person classes on the days highlighted in yellow. Instead, classes will meet on Zoom on those days.

OPEN EXPRESSION AND RESPECT FOR ALL

The following text, or an enhanced version, is required by Marshall.

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](https://www.marshall.usc.edu/open-expression-statement)" (<https://www.marshall.usc.edu/open-expression-statement>).

STATEMENT OF ACADEMIC CONDUCT

The following text, or an enhanced version, is required by Marshall.

The University of Southern California is foremost a learning community committed to fostering successful scholars and researchers dedicated to the pursuit of knowledge and the transmission of ideas. Academic misconduct is in contrast to the university's mission to educate students through a broad array of first-rank academic, professional, and extracurricular programs and includes any act of dishonesty in the submission of academic work (either in draft or final form).

This course will follow the expectations for academic integrity as stated in the [USC Student Handbook](#). All students are expected to submit assignments that are original work and prepared specifically for the course/section in this academic term. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

Other violations of academic misconduct include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

Academic dishonesty has a far-reaching impact and is considered a serious offense against the university. Violations will result in a grade penalty, such as a failing grade on the assignment or in the course, and disciplinary action from the university itself, such as suspension or even expulsion.

For more information about academic integrity see the [student handbook](#) or the [Office of Academic Integrity's website](#), and university policies on [Research and Scholarship Misconduct](#).

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment or what information requires citation and/or attribution.

STATEMENT ON SUPPORT SYSTEMS

The following text, or an enhanced version, is required by Marshall.

Students and Disability Accommodations:

USC welcomes students with disabilities into all of 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 accommodations are 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.

Student Financial Aid and Satisfactory Academic Progress:

To be eligible for certain kinds of financial aid, students are required to maintain Satisfactory Academic Progress (SAP) toward their degree objectives. Visit the [Financial Aid Office webpage](#) for [undergraduate](#)- and [graduate-level](#) SAP eligibility requirements and the appeals process.

Support Systems:

[Counseling and Mental Health](#) - (213) 740-9355 - 24/7 on call

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

[988 Suicide and Crisis Lifeline](#) - 988 for both calls and text messages - 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline consists of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

[Relationship and Sexual Violence Prevention Services \(RSVP\)](#) - (213) 740-9355(WELL) - 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

[Office for Equity, Equal Opportunity, and Title IX \(EEO-TIX\)](#) - (213) 740-5086

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) 740-2500

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

[USC Campus Support and Intervention](#) - (213) 740-0411

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

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

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) 442-1200 - 24/7 on call

Non-emergency assistance or information.

[Office of the Ombuds](#) - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

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) 442-2850 or otfp@med.usc.edu

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

Appendix I. MARSHALL GRADUATE PROGRAMS LEARNING GOALS

How GSBA 524 Contributes to Marshall Graduate Program Learning Goals

| Marshall Graduate Program Learning Goals | Objectives that support this goal | Assessment Method* |
|---|-----------------------------------|---------------------------|
| <p><i>Learning Goal #1: Develop Personal Strengths.</i> Our graduates will develop a global and entrepreneurial mindset, lead with integrity, purpose and ethical perspective, and draw value from diversity and inclusion.</p> | | |
| 1.1 Possess personal integrity and a commitment to an organization’s purpose and core values. | | |
| 1.2 Expand awareness with a global and entrepreneurial mindset, drawing value from diversity and inclusion. | | |
| 1.3 Exhibit awareness of ethical dimensions and professional standards in decision making. | | |
| <p><i>Learning Goal #2: Gain Knowledge and Skills.</i> Our graduates will develop a deep understanding of the key functions of business enterprises and will be able to identify and take advantage of opportunities in a complex, uncertain and dynamic business environment using critical and analytical thinking skills.</p> | | |
| 2.1 Gain knowledge of the key functions of business enterprises. | 1,2 | Homework and team project |
| 2.2 Acquire advanced skills to understand and analyze significant business opportunities, which can be complex, uncertain and dynamic. | 2,3 | Homework and team project |
| 2.3 Use critical and analytical thinking to identify viable options that can create short-term and long-term value for organizations and their stakeholders. | 4,5 | Team Project |
| <p><i>Learning Goal #3: Motivate and Build High Performing Teams.</i> Our graduates will achieve results by fostering collaboration, communication and adaptability on individual, team, and organization levels.</p> | | |
| 3.1 Motivate and work with colleagues, partners, and other stakeholders to achieve organizational purposes. | 4,5 | Team Project |
| 3.2 Help build and sustain high-performing teams by infusing teams with a variety of perspectives, talents, and skills and aligning individual success with team success and with overall organizational success. | 4,5 | Team Project |
| 3.3 Foster collaboration, communication and adaptability in helping organizations excel in a changing business landscape. | | |

Appendix II

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| SAMPLE PEER EVALUATION FORM |
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Please identify your team and team members for the ____ Project(s) that you worked on. Then rate all your team members, *including yourself*, based on the **contributions** of each team member for the selected assignment according to the criteria listed below. On a scale of 0 – 2 with 0 indicating does not meet expectations, 1 meets expectations and 2 exceeds expectations, rate each person on each of the five criteria. Lastly, add up the points for each person with the maximum number of points for each person being 10. In the box below, describe the exact contributions of each team member, including yourself.

| Team Members/ Assessment Criteria of Team Contributions | Team Member 1 | Team Member 2 | Team Member 3 | Yourself |
|---|------------------|------------------|------------------|----------|
| 1. Role Performance | | | | |
| 2. Assists Team Members | | | | |
| 3. Listening and Discussing | | | | |
| 4. Research and Information Sharing | | | | |
| 5. Time Management | | | | |
| Total | | | | |

Contribution details:

Appendix III

SAMPLE MIDPOINT COURSE EVALUATION QUESTIONS

Faculty are encouraged to give students midpoint course evaluations to gauge student concerns and adjust the course early on. Student feedback is for instructor use only and not a part of the formal performance review process. Instructors are encouraged to review the comments and discuss in the following class session.

In order to continuously improve the effectiveness of our class, could you please take a few moments to answer the following questions:

1. How well do the course objectives support your general business knowledge and personal career goals?
2. What have you liked about this course so far?
3. Do you have any suggestions for improving the course experience?