

USC Marshall

School of Business

DSO 516: Probability & Data Modeling, Spring 2025 - 1.5 Units
Class Time: Monday/Wednesday, 12:30 – 1:50 p.m. in JKP212

Instructor: Dr. Arif Ansari
Office: BRI 401 R (Main Campus) and Zoom Office hours
Office Hours: 3:30-4:30 p.m. on Class days and by Zoom Appointment
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COURSE DESCRIPTION

This course is intended for all students interested in how to deal with uncertainty when building mathematical models (Probability models, Statistical models, Simulation models, Decision models, etc.). In this course, Business data applications, including model-building and simulations using Excel, will be explored. This course is also a pre/co-requisite for the more advanced course DSO 536: Monte Carlo Simulation and Decision Models.

We live in age of AI, in this era, GenAI, Analytics, Data-driven Decision Making and Data-Driven Strategies are the main source of getting Competitive Advantage in the turbulent Business World. The focus of the course is to make current and future managers to think probabilistically, model the data appropriately to become analytically savvy. This course will enable students to leverage data, analyze data, build quantitative models, interpret the results and make data-driven decisions.

COURSE OBJECTIVES

1. Explain basic probability concepts and use common discrete and continuous distributions for modeling.
2. Model Business Scenarios using appropriate Sample Space & Random Variables.
3. Apply techniques for deciding what probability distribution represents given data.
4. Apply tools and theorems to make probability calculations when an underlying distribution is not known.
5. Apply Critical Thinking and Creative Thinking to model, interpret and make decision under uncertainty.

COURSE MATERIALS

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

TEXTBOOK - Please note the textbook is recommended.

DSO 516: Probability & Data Modeling	
ISBNI3	978-0-9899108-7-3.
Title	Applied Probability: Models and Intuition
Author	Arnold I. Barnett
Publisher	Dynamic Ideas LLC

- **CLASS NOTES – Posted in Brightspace.**

Class notes (power point slides) for this class will be available in Brightspace. You should familiarize yourself with these notes **before they** are covered in class.

SOFTWARE – EXCEL

Optional: JMP – Refer to Brightspace for Instructions to download JMP 17

Go to USC ITS website (you can also google USC JMP to get to the website) also instructions to download are provided in Brightspace.

You will be using Excel and JMP software to describe and analyze data. Excel will be used for simulation. 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 Brightspace Course Pages, please contact the Marshall HelpDesk at 213-740-3000 or HelpDesk@marshall.usc.edu.

----- Why JMP for Managers & C-Level -----

JMP (pronounced “jump”) is statistical software made by SAS that enables users to easily explore, build models, and visualize data using a variety of tools for statistical, Analytical, and Machine Learning 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 programming. Therefore, it is an ideal Analytical package for Students, Managers and Executives. JMP assists the user in choosing correct analytic procedures and in interpreting results.

COURSE FORMAT

This course is taught in a partial flipped format. All course materials can be found in Brightspace (<https://Brightspace.usc.edu>). This course is divided into modules, and each module is intended to cover one or two or three class session(s). Module activities may include reading assignments, weekly lessons, interactive exercises, homework assignments, Brightspace discussion forums, class sessions, and quizzes or exams. It is expected that students will have completed all required activities and assignments *before* attending their class session for each week.

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

Zoom is the platform used for all online sessions and online office hours. A link and instructions to join the Zoom sessions will be posted in the Brightspace Course Pages. For more information about Zoom, go to: [Zoom Support Tutorials](#)

Email: The following email protocol is required for effective administration of the class.

- **Don't email from non-USC accounts, most of the time my spam filter will filter out your message. Use USC email only. If you did not get a reply within 3 days - email again.**
- **The subject part of the email should start with DSO516, example, DSO516 - question on today's class - Reply Requested (or Reply not Requested)**
- When you email the grader, the professor should be carbon copied.
- Don't expect a reply for the email on weekends; I will try my best to answer your emails in a timely manner. **In emergency, send text with your information and reason to professor phone and then call him.**

CLASSROOM POLICIES

1. Class attendance and participation is important in developing a coherent view of the materials covered in the course. Unless accommodated as described in (b) below, attendance and active participation is expected at the synchronous Zoom class sessions.
 - a. Students are expected to have cameras on during the synchronous Zoom sessions, and preferably use headsets or earphones to ensure the best audio quality. *Please advise me if you have circumstances under which you will not be able to meet these expectations.*
 - b. For students who are located in a time zone where the synchronous class sessions or exams fall outside the window of 8 a.m. to 10 p.m. in your local time zone, please contact me. You will not be penalized for not attending the live Zoom class sessions. The Zoom sessions will be recorded and posted on Brightspace, and you will be responsible for watching the recorded sessions. Exams and other synchronous assessments will be scheduled for students to be able to complete the assessment between 8 a.m. and 10 p.m. in your local time zone.
 - c. In addition, for any student who does not attend the Zoom session live, you will be required to complete the following assignment as an alternate method of contribution to the class:

Email your completed assignments for every class session that you do not attend to your instructor.

2. During synchronous Zoom sessions, the following netiquette is expected, as if you were in a physical classroom.
 - a. Please do:
 - i. Log into class early or promptly
 - ii. Arrange to attend class where there is a reliable internet connection and without distractions
 - iii. Dress respectfully. Video conference business meetings are and will be the norm, so practice your professional telepresence.
 - iv. If you use a virtual background, please keep it respectfully professional.
 - v. Display both your first and last name during video conferencing and synchronous class meetings.
 - vi. Respectfully minimize distractions by muting and or turning off video if necessary and when appropriate.
 - vii. Engage in appropriate tone and language with instructors and classmates.

- b. Please try not to:
 - i. Engage in a simultaneous activity not related to the class.
 - ii. Interact with persons who are not part of the class during the class session.
 - iii. Leave frequently or not be on camera for extended periods of time.
 - iv. Have other persons or pets in view of the camera.
3. All Zoom sessions will be recorded and posted in the Brightspace Course pages.

TECHNOLOGY REQUIREMENTS

The following equipment and system requirements are recommended to successfully participate in this online course:

- Computer with webcam
- Earphones or headset
- Reliable (preferably high speed) Internet connection
- Current operating system for Windows or Mac
- Current browser
 - Google Chrome
 - Firefox
 - Internet Explorer (not recommended)
 - Safari (Mac)

For technical support please see:

- **For Brightspace support go to USC ITS Services Website or call USC ITS at 213.740.555**
- **Zoom Video Web Conferencing System**
For assistance using Zoom, go to [Zoom Support Page](#). You may also call +1 (888) 799-9666 ext. 2. They are available 24/7.
- **Marshall Systems (MyMarshall, Marshall Outlook email)**
For assistance with Marshall systems you can call +1 (213) 740-3000 Mon-Fri 8am-6pm (Pacific), email HelpDesk@marshall.usc.edu, or use our self-help service portal as shown below. The portal allows you to get immediate assistance by searching for the information you need. You can also use it to chat with a technician or input a request. To access the service portal, follow these steps:
 - On a computer or mobile device, go to [MyMarshall Home Page](#) and click the “**Help**” link on the upper right.
 - Log in using your Marshall username and password.
(If you don’t know your Marshall login please follow the onscreen instructions pertaining to login issues)

If your computer does not have Microsoft Word, Office 365 package is available to you free of charge and allows you to install Word, Excel, PowerPoint, Outlook, OneNote, Publisher, and Access on up to 5 PCs or Macs and Office apps on other mobile devices including tablets. Office 365 also includes unlimited cloud storage on OneDrive. To download Office 365 log into your student (University) email through a web browser, choose Settings (top right corner), and select software. If you have further questions or need help with the software, please contact the USC ITS service portal.

GRADING

Grades are determined by your homework average, participation and the final. Letter grades will be determined at the end of the course according to a GPA of 3.3 for core courses and 3.5 for electives. Letter grades will not be given for individual assignments.

Three items are considered when assigning final grades:

1. Your average weighted score.
2. The overall average percentage score within the class.
3. Your ranking among all students in the class.

Three Homework (15% each)	45%
Final Exam	30%
Class Participation & Simulations	25%

CLASS PARTICIPATION (Refer to Appendix III)

HOMEWORK

The assignments are to be done and submitted individually to Brightspace, although you may work in groups. The exam will be on the last class session and is open notes, in the last 15 minutes you can use your laptop computers. For class participation, each student should be prepared to contribute individually to the class discussion. The quality of the contribution is more important than the quantity of contributions.

EXAMS

Exams are open Class Notes. You need to a calculator that can do business calculations. Suggested calculator is HP 17B.

The final exam will cover all material taught in the class. You CANNOT be exempted from this final even if you have an A average. NO MAKE-UPS OF THE FINAL EXAM WILL BE GIVEN.

THE IMPORTANCE OF COURSE EVALUATIONS

The student course evaluations are valuable. This course is continuously improved, based on feedback from students and instructor observations. (See Appendix IV for optional mid-point evaluation.)

USE OF RECORDINGS

Pursuant to the *USC Student Handbook* (<https://policy.usc.edu/studenthandbook/>, page 27), students may not record a university class without the express permission of the instructor and announcement to the class. In addition, students may not distribute or use notes or recordings based on USC classes or lectures without the express permission of the instructor for purposes other than personal or class-related group study by students registered for the class. This restriction on unauthorized use applies to all information that is distributed or displayed for use in relationship to the class. Violation of this policy may subject an individual or entity to university discipline and/or legal proceedings.

COURSE OUTLINE AND ASSIGNMENTS

Week	Date	Topic	Reading	Due/Other
1	1/13	Introduction	Ch. 1	Class Participation
	1/15	Basic Probability Concepts		
2	1/20	Holiday	Ch. 2.1 – 2.4	Class Participation
	1/22	Probability, contd. Discrete Random Variables		
	1/24			
3	1/27	Simulation, Continuous Random Variables	Chs 3.1 – 3.3, 3.8	Simulation, Class Participation
	1/29	Inversion Method with Normal & Exponential		
4	2/03	Common Distributions	Chs 2.5 – 2.9, 3.4 – 3.6	Simulation, Class Participation
	2/05	Simulation, Common Distributions, contd.		
	2/07			
5	2/10	Sums of Random Variables	Chs 3.6, 4.1–4.4, 4.8 & 4.9	Class Participation
	2/12	Joint Distributions & Correlations		
6	2/17	Exploratory Data Analysis	Class Slides	Simulation, Class Participation
	2/19	Simulation, Logistic Regression Modeling		
	2/21			
7	2/24	Business Modeling & Applications	Class Slides	
	2/26	Class Review		
8	3/03	Review	Class Slides	Final Exam
	3/07	Final Exam	In Class	

POLICY ON THE USE OF AI-GENERATORS IN CLASS

Permitted on specific assignments: In this course, we encourage you to use artificial intelligence (AI)-powered programs to help you with assignments that clearly indicate the permitted use of AI. In particular, please be aware that you may not use AI tools when doing the Exam for this course. You and your team (in case of group assignments) should further refine any inputs you obtain from an AI tool using your own knowledge and experience. You should be aware that AI text generation tools may present incorrect information, biased responses, and incomplete analyses; thus they are not yet prepared to produce text that meets the standards of this course. To adhere to our university values, you must cite any AI-generated material (e.g., text, images, etc.) included or referenced in your work and provide the prompts used to generate the content. Using an AI tool to generate content without proper attribution will be treated as plagiarism and reported to the Office of Academic Integrity. Please review the instructions in each assignment for more details on how and when to use AI Generators for your submissions.

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

STATEMENT ON ACADEMIC CONDUCT AND SUPPORT SYSTEMS

Academic Integrity:

The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, compromises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

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

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

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.

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.

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 is comprised 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) 740-5086 or (213) 821-8298

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.

SUPPORT SYSTEMS

TECHNICAL SUPPORT

- For Brightspace support go to [USC ITS Services Website](#) or call USC ITS at 213.740.555
- For [Zoom Support](#) or call (888) 799-9666 ext. 2

Appendix I. MARSHALL GRADUATE PROGRAMS LEARNING GOALS

How GSBA 524b Contributes to Marshall Graduate Program Learning Goals

Marshall Graduate Program Learning Goals	DSO516 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, Discussion
2.2 Acquire advanced skills to understand and analyze significant business opportunities, which can be complex, uncertain and dynamic.	2,3,4	Homework, Simulation
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.	5	Class Participation
<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	Class Participation
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	Class Participation
3.3 Foster collaboration, communication and adaptability in helping organizations excel in a changing business landscape.		

APPENDIX II.

SAMPLE PEER EVALUATION FORM – NOT NEEDED FOR THIS COURSE

APPENDIX III.

SAMPLE COURSE PARTICIPATION RUBRIC

The following rubric provides a guide as to how course participation will be assessed.

Active Participation	Moderate Participation	Low Participation
Exhibits evidence of having completed all assignments and activities according to guidelines that were assigned	Attempts to participate and has completed most assignments and activities	Exhibits lack of preparation and non-completion of required assignments
Initiates discussion and supports points using page-specific references to readings or specific reference points in film/videos	Supports points during discussion but uses general references to readings and other materials	Rarely initiates discussion and is not able to reference required readings or other materials
Furtheres the discussion and builds on the ideas of others; comments and questions reflect having thought deeply about the material	Furtheres the discussion and builds on the ideas of others; general or limited references to course materials	Comments do not further the discussion and do not exhibit careful reflection on the material

DISCUSSION BOARD RUBRIC

The following rubric provides a general guide as to how written assignments or other products in this course will be evaluated.

	Excellent	Acceptable	Unsatisfactory
Depth of thought	Shows evidence of depth of thought in preparation, organization, and clarity.	Evidence of depth of thought could be increased in some areas.	Not evident that serious thought went into preparation or organization.
Connection to course materials	Assignment shows engagement with course readings and other relevant literature and integrates this in an appropriate manner.	Some parts lack connection to course readings or other sources, or they are not integrated in an appropriate way.	Fails to relate to course materials and other relevant literature.
Completeness	All parts of the assignment are done completely and according to guidelines.	All parts of the assignments or presentation are done completely, however, lacks adherence to guidelines in some areas.	Assignment is not entirely complete, and/or shows marked lack of adherence to guidelines.

Format	Assignment is free of grammatical, spelling, and format errors and is consistent with APA Guidelines.	Assignment contains some errors in one or more of the areas related to format.	Assignment contains significant format errors which detract from the meaning.
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APPENDIX IV

SAMPLE MIDPOINT COURSE EVALUATION QUESTIONS

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?