



# USC

**University of Southern California**  
**ISE 220 – Probability Concepts in Engineering**  
**Spring 2022**

**Time:** TTh 9:30-10:50 am

**Location:** VPD 116

**Instructor:** Yalda Khashe

**Office:** <https://usc.zoom.us/my/yaldakhashe>

**Office Hours:** By appointment on Wednesdays 2-3:30pm

**Contact Info:** [khashe@usc.edu](mailto:khashe@usc.edu)

**Teaching Assistant:** Tianchi Zhao

**Office:** Zoom

**Office Hours:** TBD

**Contact Info:** [tianchiz@usc.edu](mailto:tianchiz@usc.edu)

**Catalog Course Description:**

Techniques for handling uncertainties in engineering design: discrete and continuous random variables; expectations, probability distributions, and transformations of random variables; limit theorems; approximations and applications.

**Text:**

*A First Course in Probability*, by Sheldon Ross, Pearson, 10<sup>th</sup> edition (2019), ISBN: 9780134753683

Supporting Text book:

*Statistics for Business and Economics*, by Anderson D.R., D.J. Sweeney and T.A. Williams, Thompson/South-Western, 12<sup>th</sup> edition (2014), ISBN: 1-133-27453-6

**Course Expectations and Policies:**

***Course Expectations and Netiquette:*** To ensure a cooperative learning environment, each student is expected to read the text before each class meeting time, and prepare to actively participate during class discussions, team-related activities, presentations, and writings.

Netiquette is network etiquette; a set of rules that encourages appropriate and courteous online behavior. The list of “Netiquette Rules for Class” is included on page 8 of this syllabus. Students are expected to engage in behaviors that enhance the learning environment. Our goal is to optimize the learning experience for all the students; therefore, disruptive behaviors are prohibited and will not be tolerated.

***COVID-19 Policy***<sup>1</sup>: We recognize that there are challenges associated with attending and participating in courses during the COVID-19 pandemic (or surges associated with

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<sup>1</sup> As the conditions of the current Covid-19 pandemic changes, we may have to alter details of this syllabus. Please keep updated with announcements on Blackboard and the USC website.

the pandemic during face-to-face sessions). USC has provided information related to the COVID-19 and how USC is meeting the campus community's needs. Continuously updated COVID-19 requirements can be found on the USC COVID-19 resource center website <https://coronavirus.usc.edu/>. All students, faculty, staff, and guests must comply with the USC COVID-19 safety guidelines or be subject to disciplinary action.

**Importantly**, if you become ill, become COVID-19 symptomatic, and/or test positive for COVID-19 during the semester, you will be required to attend classes remotely until you have a negative COVID-19 test result and are asymptomatic. Please rest and contact the USC Health Center for assistance. Stay home if you have come in close contact with someone who has been infected with Covid-19, and contact your healthcare provider for guidance. The course will be provided to you remotely via Zoom while your course peers are taking the class in the USC classroom until you are able to return to our face-to-face class.

In compliance with the LA County Department of Public Health order, **everyone** must wear a mask indoors, regardless of vaccination status. **Accordingly, you must wear masks at all times during class and no eating or drinking are allowed in class due to the COVID-19 protocols.** Refusal to comply with university masking policy is a disciplinary matter and will be referred to Student Judicial Affairs and Community Standards (SJACS): <https://sjacs.usc.edu/>. If you have any questions or require assistance please contact USC COVID-19 hotline: (213) 740-6291, [covid19@usc.edu](mailto:covid19@usc.edu).

***Participation and Attendance Policy:*** It is expected that students will attend class regularly and participate in the class discussion throughout the semester. participation involves actively listening and volunteering answers to questions and moving the discussion along toward a shared understanding. The participation grade will be assigned at the end of the semester based on objective (contribution to class discussions, interaction with TA/Instructor inside and outside the classroom) and subjective (contributing meaningful questions/answers, illustrating comprehension of course material) assessment by the instructor. The participation rubric is included at the end of this syllabus.

University policy regarding attendance in synchronous sessions requires that the students plan to attend every synchronous session for the classes in which they are enrolled, irrespective of when it occurs in their time zone. If the class falls outside the reasonable learning hours in your time zone, defined as 7:00 am to 10:00 pm, contact us so we can discuss your attendance and participation requirements. We also create a discussion forum for each session of the class on Blackboard to potentially move some of the class discussions online, especially to accommodate students in different time zones.

***Camera Policy:*** To maintain class dynamics to the extent possible in the online/virtual environment, that students are expected to have their **cameras on** during synchronous online sessions. You can use virtual backgrounds for a more private setup and earphones or headsets to improve audio quality. Please contact me directly if you have any concerns or limitations regarding the camera-on policy and we will discuss expectations and accommodations needed.

**Recording Online Classes:** USC policy requires that all classes conducted online to be recorded for asynchronous viewing with transcriptions made available. Recordings ensure that all classes are ADA compliant, and can be freely accessed at all times by students irrespective of the region or time zone they are studying from. Students are responsible for the appropriate use and handling of these recordings under existing SCampus policies regarding class notes (<https://policy.usc.edu/scampus-part-c/>). You are not permitted to create your own class recordings without the instructor's permission. Violations of these policies will be met with the appropriate disciplinary sanction.

**Due Dates/Make-Up Work:** Exams must be taken as scheduled. Assignments are due as scheduled. Make-ups will be allowed only if the student has contacted the professor before the due date, detailing a serious problem. Make-up exams should be scheduled before the next instruction session and cannot be taken before the scheduled exam.

**Online Communication Policy:** Students are encouraged to contact the instructor by USC email and schedule a meeting during office hours. In the subject line, indicate the course number and a very brief summary of the email. Simple questions will be answered by email, but for more complex discussions students may be instructed to schedule a zoom meeting. We will do our best to respond to your emails as soon as possible. We will be less responsive on the weekends or during holidays.

**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, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A: <http://usc.edu/dept/publications/SCAMPUS/gov/> 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://usc.edu/student-affairs/SJACS/> Information on intellectual property at USC is available at: <http://usc.edu/academe/acsen/issues/ipr/index.html>.

**Statement for Students with Disabilities:** Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to your course instructor (or TA) as early in the semester as possible. DSP is located in STU 301 and is open from 8:30 am to 5:00 pm, Monday through Friday. Website and contact information for DSP [http://sait.usc.edu/academic-support/centerprograms/dsp/home\\_index.html](http://sait.usc.edu/academic-support/centerprograms/dsp/home_index.html) (213)740-0776(Phone), (213)740-6948(TDD only), (213)740-8216(FAX), [ability@usc.edu](mailto:ability@usc.edu)

**USC Technology Support Links:**

Zoom information for students (<https://itservices.usc.edu/zoom/>)

Blackboard Help for students (<https://studentblackboardhelp.usc.edu/>)

Software available to USC Campus (<https://software.usc.edu/>)

**Grading:**

I. Letter Grades Table:

|        |    |        |    |
|--------|----|--------|----|
| 96-100 | A  | 75-79  | C+ |
| 91-95  | A- | 70-74  | C  |
| 87-90  | B+ | 65-69  | C- |
| 84-86  | B  | 60-65  | D+ |
| 80-83  | B- | 56-60* | D  |

\* Grades less than 56: F

The final grade will be based on the above table combined with the cluster analysis of all the students' grades. Which will be explained in detail in the first class session.

II. The final course grade will be determined based on the following weights:

|                                       |      |
|---------------------------------------|------|
| Exam 1 .....                          | 22 % |
| Exam 2 .....                          | 22 % |
| Final Exam. ....                      | 26 % |
| Homework .....                        | 20 % |
| Participation/in-class exercises..... | 10 % |

According to USC policy: "No student is allowed to retake a final examination or do extra work in a course after the semester has ended for purposes of improving his/her grade." [https://arr.usc.edu/forms/ARR\\_Grade\\_%20Handbook.pdf](https://arr.usc.edu/forms/ARR_Grade_%20Handbook.pdf)

**Exams:** Exams consist of true/false, multiple-choice, short answers, and essay questions. If you cannot take an exam on the scheduled date and time, you must provide documents from a responsible party (doctor, court, police, etc.) and you must arrange to take the exam before the following class meeting. The final exam date/time is set USC and cannot be rescheduled.

**Assignment Submission:** Homework descriptions will be posted on blackboard and assignments are due at the beginning of the class and should be submitted online through Blackboard. Electronic submission must be in MS Office formats.

**In-class Work and Class Discussions:** Students will complete work assigned during class time, such as small group assignments, open-notes quizzes, and polls that count towards their in-class work grade. There is no late submission for in-class exercises. Most activities are designed as group exercises; however, no credit will be given to team members who miss the exercises. Credit will be given for thoughtful completion. The lowest two scores on in-class work will be dropped.

**NOTE:**

Course materials and grades will be posted on the Blackboard page. Please make sure that you have access to the blackboard and your **USC account** is up and running.

Due to administrative processes, **this syllabus is subject to change.** It is the **student's responsibility** to verify with the instructor regarding any updates.

## Tentative Course Outline<sup>2</sup>:

| Week of                |          | Topics   | Assignment Due <sup>3</sup>                         | Book Chapter |
|------------------------|----------|--|---|--------------|
| 01                     | Jan 10   | Introduction and Logistics of the course<br>Data and Probability |   |              |
| 02                     | Jan 17   | Probability and Basic Principles of Counting                     |   | CH1          |
| 03                     | Jan 24   | Sample Space, Events, Axioms of probability                      | Homework 1  | CH2          |
| 04                     | Jan 31   | Conditional Probability and Bayes' Theorem                       | Homework 2  | CH3          |
| 05                     | Feb 7    | <b><u>February 8 – Exam 1</u></b><br>Exam Review                 | Homework 3  |              |
| 06                     | Feb 14   | Random Variables, Discrete Distribution                          |   | CH4          |
| 07                     | Feb 21   | Expected Value & Variance  |   | CH4          |
| 08                     | Feb 28   | Binomial Probability, Poisson Random Variable                    | Homework 4  | CH4          |
| 09                     | March 7  | Continues Probability Distribution, expectation and variance     |   | CH5          |
| 10                     | March 14 | <b><i>Spring Recess - University Holiday</i></b>                 |   |              |
| 11                     | March 21 | <b><u>March 22 – Exam 2</u></b><br>Exam Review                   | Homework 5  | CH5          |
| 12                     | March 28 | Normal Random Variables & Normal approximation to Binomial       |   | CH5          |
| 13                     | April 4  | Exponential Random Variables                                     | Homework 6  | CH6          |
| 14                     | April 11 | Jointly Distributed Random Variables                             |   | CH7          |
| 15                     | April 18 | Properties of Expectation, Conditional Expectation               |   | CH8          |
| 16                     | April 25 | Limit Theorems<br><b><i>Final Review</i></b>                     | Homework 7<br><b><i>Due: Course Evaluations</i></b> |              |
| <i>Tuesday, May 10</i> |          | Final Exam (8-10 am) <sup>4</sup> - Mandated by USC Schedule     |   |              |

<sup>2</sup> Schedule may be revised to accommodate the content and pace of the class learning process. Due dates and case studies are subject to change.

<sup>3</sup> Check Blackboard submission links for the due date and assignment instructions

<sup>4</sup> **Confirm the time and date of the exam on the USC website.**

### **Netiquette Rules for Class**

Netiquette is network etiquette; a set of rules that encourages appropriate and courteous online behavior.

- Above all, show respect to your peers and the instructor.
- Respect the opinions of others, regardless of how much you disagree.
- If you are writing an email or discussion post in anger, the content of your text will probably come off as disrespectful. Give yourself time to calm down and show respect.
- Reflect kindness and concern for your colleagues, you never know when someone else is having the worst day of their life.
- Allow others to save face. When possible, allow others the option of coming to the same conclusion, rather than pushing an opinion or answer on them. Instead of saying, "That's not right, it should be purple," consider saying this instead, "Would purple be a better color in this situation?"
- Address your instructor with their full title (e.g. Professor or Dr.) unless they explicitly tell you otherwise.
- Let others know how you would like to be addressed and address others as they would like to be addressed.
- Limit your use of the exclamation point.
- Avoid using all caps. IT IS COMMONLY INTERPRETTED AS YELLING.
- Humor is difficult to interpret text-based communication. Consider avoiding it in professional and academic communication.
- Check your spelling and grammar before hitting send or submit. This is an academic community and part of being professional is checking and double-checking your work.
- Use professional language and avoid using social media language and characters (i.e. don't use slang, text shortcuts, such as "u" instead of "you," emojis, emoticons).
- Use appropriate fonts.
- Use appropriate font size: 12 font for papers (you can use 10 for tables); 11 or 12 in emails or discussion board posts.
- In emails, be brief. After greetings, put the most important point in the first sentence. Do not make the reader get halfway (or all the way) through the email before you present the reason for the email.
- In the discussion board, expand on your thoughts. Explain why you agree with them or why you think it's a great post.
- Give details to your discussion post. What was your source and what pages were you looking at?

A more comprehensive list of communication norms is posted on the course page on Blackboard.

## Participation Ruberic

| Excellent Performance  | Fair / Average Performance   | Unacceptable Performance  |
|--|--|---|
| <ul style="list-style-type: none"> <li>• Initiates information relative to topics discussed</li> <li>• Accurately exhibits knowledge of assignment content</li> <li>• Clarifies points that others may not understand</li> <li>• Shares personal experiences or opinions related to topic</li> <li>• Offers relevant / succinct input to class</li> <li>• Actively participates in labs and class exercises</li> <li>• Demonstrates ability to apply, analyze, evaluate &amp; synthesize course material.</li> <li>• Demonstrates willingness to attempt to answer unpopular questions</li> <li>• Builds on other students' contributions</li> </ul> | <ul style="list-style-type: none"> <li>• Participates in group discussions when asked</li> <li>• Demonstrates knowledge of course material</li> <li>• Offers clear, concise, "good" information on class assignments</li> <li>• Offers input, but tends to reiterate the intuitive</li> <li>• Attends class regularly</li> </ul> | <ul style="list-style-type: none"> <li>• Fails to participate even when specifically asked</li> <li>• Gives no input to discussions</li> <li>• Does not demonstrate knowledge of the readings</li> <li>• Shows up to class: does nothing</li> <li>• Distracts group/class</li> <li>• Irrelevant discussion</li> </ul> |

### 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](http://policy.usc.edu/scampus-part-b). Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, [policy.usc.edu/scientific-misconduct](http://policy.usc.edu/scientific-misconduct).

### **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. [studenthealth.usc.edu/counseling](http://studenthealth.usc.edu/counseling)

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

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. [suicidepreventionlifeline.org](http://suicidepreventionlifeline.org)

*Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call*

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. [studenthealth.usc.edu/sexual-assault](http://studenthealth.usc.edu/sexual-assault)

*Office of Equity and Diversity (OED) - (213) 740-5086 | Title IX – (213) 821-8298*

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. [equity.usc.edu](http://equity.usc.edu), [titleix.usc.edu](http://titleix.usc.edu)

*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 of Equity and Diversity |Title IX for appropriate investigation, supportive measures, and response. [usc-advocate.symplicity.com/care\\_report](https://usc-advocate.symplicity.com/care_report)

*The Office of Disability Services and Programs - (213) 740-0776*  
Support and accommodations for students with disabilities. Services include assistance in providing readers/note takers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs. [dsp.usc.edu](https://dsp.usc.edu)

*USC Campus Support and Intervention - (213) 821-4710*  
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student. [campussupport.usc.edu](https://campussupport.usc.edu)

*Diversity at USC - (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. [diversity.usc.edu](https://diversity.usc.edu)

*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. [dps.usc.edu](https://dps.usc.edu), [emergency.usc.edu](https://emergency.usc.edu)

*USC Department of Public Safety - UPC: (213)740-6000, HSC: (323)442-120 – 24/7 on call*  
Non-emergency assistance or information. [dps.usc.edu](https://dps.usc.edu)