San Jose State University
College of Engineering
Electrical Engineering Department

EE102 (Section 01) Probability and Statistics in Electrical Engineering Fall 2021

Course and Contact Information
Instructor: Nader F. Mir
Office Location: Department of Electrical Engineering, College of Engineering, E251
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E-mail Address: nader.mir@sjsu.edu (do not use Canvas email)
Office Hours: Mon./Wed., 10:15am–10:30am by Zoom; Mon./Wed., 8:45pm–9:00pm in Clark222; by appointment for a Zoom session if necessary.
Instructor’s Website: http://www.sjsu.edu/people/nader.mir/
Class Days/Time: Mon./Wed., 9:00am - 10:15am
Classroom: For exams to be administered in-person only, location TBA
Prerequisites: EE112 with grade C- or better

Note: No classes on Nov. 10 and 15

Course Description
Introduction to probability and statistical analysis for undergraduate EE students. Discrete probability theory, the theory of single random variables, introduction to statistics and hypothesis testing, and EE applications. Credit Hours: 3

Course Format
Hybrid (lectures are online, all exams are in-person in campus with locations TBA).

Zoom Links of Course Lectures
Zoom links of lectures are found in the “Announcements” section of Canvas.

Communications with Instructor and Location of Course Materials
All communications from/to instructor must use nader.mir@sjsu.edu (and not Canvas email). Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on Canvas. Please check Canvas regularly through MySJSU to learn of any updates. For help with using Canvas see Canvas Student Resources page.

Course Learning Outcomes (CLOs)
Upon successful completion of this course, students will be able to:
• CLO1 define a random experiment, outcome, event, certain event, null event, and sample space
• CLO2 find the probability of an event
• CLO3 apply set theory in calculation of probabilities
• CLO4 determine whether events are equally likely, mutually exclusive or independent
• CLO5 define a random variable; classify random variables as discrete or continuous, compute probabilities from probability mass (density) functions and cumulative distribution functions
• CLO6 calculate mean, variance, moments, probabilities associated with a random variance and its transformations
• CLO7 compute probabilities (joint and conditional) of two random variables. Test independence of two random variables
• CLO8 model and analyze systems with specific EE applications using discrete random variables
• CLO9 model and analyze systems with specific EE applications using continuous random variables
• CLO10 describe data using statistics such as average, variability, and correlation.

Student Outcomes
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Required Textbook
*Probability and Stochastic Processes for Electrical and Computer Engineers*, By: R. D. Yates and D. J. Goodman.

Note: while the flow of lectures is in-line with the 2nd edition of this textbook, any of the 1st, 2nd, and 3rd editions of this textbook can be used for this course. The instructor tries to make the copies of book’s exercises assigned for each homework available to students.

Other Readings
Course Requirements and Assignments

“Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.” (University Policy S16-9)

Grading Information

The class attendance is required and is an important factor to achieve the learning objectives of this course.

The total grade (100%) breakdown is as follows:

- Assignments: 10%
  Homework assignments are normally bi-weekly. Softcopies of assignments are required to be uploaded onto Canvas. Working on assignments is an important factor to achieve the learning objectives of this course. Answers to homework will be provided before each exam.

- Midterm Exam: 40%
  A midterm exam (Wednesday, October 27th, during normal class time, in-person, in campus, location TBA)

- Final Exam: 50%
  Final exam (According to the University final exams schedule: Thursday December 9th, starting at 7:15am, in-person, in campus, location TBA)

Standard Grading Percentage Breakdown (after possible normalizations):

<table>
<thead>
<tr>
<th>Grade</th>
<th>Points</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>A plus</td>
<td>960 to 1000</td>
<td>96 to 100%</td>
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<tr>
<td>A</td>
<td>930 to 959</td>
<td>93 to 95%</td>
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<tr>
<td>A minus</td>
<td>900 to 929</td>
<td>90 to 92%</td>
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<tr>
<td>B plus</td>
<td>860 to 899</td>
<td>86 to 89%</td>
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<tr>
<td>B</td>
<td>830 to 829</td>
<td>83 to 85%</td>
</tr>
<tr>
<td>B minus</td>
<td>800 to 829</td>
<td>80 to 82%</td>
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<tr>
<td>C plus</td>
<td>760 to 799</td>
<td>76 to 79%</td>
</tr>
<tr>
<td>C</td>
<td>730 to 759</td>
<td>73 to 75%</td>
</tr>
<tr>
<td>C minus</td>
<td>700 to 729</td>
<td>70 to 72%</td>
</tr>
<tr>
<td>D plus</td>
<td>660 to 699</td>
<td>66 to 69%</td>
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</tbody>
</table>
### University Policies

Per [University Policy S16-9](http://www.sjsu.edu/senate/docs/S16-9.pdf), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo), which is hosted by the Office of Undergraduate Education. Make sure to visit this page to review and be aware of these university policies and resources.

### EE Department Honor Code

The Electrical Engineering Department will enforce the following Honor Code that must be read and accepted by all students.

“I have read the Honor Code and agree with its provisions. My continued enrollment in this course constitutes full acceptance of this code. I will NOT:

- Take an exam in place of someone else, or have someone take an exam in my place
- Give information or receive information from another person during an exam
- Use more reference material during an exam than is allowed by the instructor
- Obtain a copy of an exam prior to the time it is given
- Alter an exam after it has been graded and then return it to the instructor for re-grading
- Leave the exam room without returning the exam to the instructor.”

### Measures Dealing with Occurrences of Cheating:

- Department policy mandates that the student or students involved in cheating will receive an “F” on that evaluation instrument (paper, exam, project, homework, etc.) and will be reported to the Department and the University.
- A student’s second offense in any course will result in a Department recommendation of suspension from the University.

### Tentative Course Schedule

1. Fundamentals of Set Theory and Probabilities, (Chapter 1)  
   Weeks 1 and 2

2. Sequential, Bernoulli, and Binomial Laws, (Chapter 1)  
   Weeks 2 and 3
3. Discrete Random Variables, (Chapter 2)
   Weeks 4 and 5

4. Continuous Random Variables, and Transfer Methods, (Chapter 3)
   Weeks 5, 6, and 7

   *Quick Review and Midterm Exam*
   Week 8

5. Pairs of Random Variables, (Chapters 4, and 5)
   Weeks 9, and 10

   *(Note: no classes on Nov. 10 and 15)*

6. Sums of Random Variables, (Chapter 6)
   Weeks 11, 12, and 13

7. Applications of Random Signal Processing, and Statistics, (Chapter 7, and handout)
   Weeks 14 and 15

   *Quick Review, and Final Exam’*
   Week 16