San José State University

College of Engineering/Electrical Engineering
EE102, Probability and Statistics in Electrical Engineering, Fall 2018

Course and Contact Information
Instructor: Juzi Zhao
Office Location: ENGR 371
Telephone: (408) 924-3993
Email: juzi.zhao@sjsu.edu
Office Hours: MW 1.30pm-2.30pm, Th 10.00-11.30am and by appointment
Class Days/Time: MW 10.30am-11.45am
Classroom: ENGR 341
Prerequisites: EE 112 with a grade of C- or better

Faculty Web Page and MYSJSU Messaging
Copies of Course materials such as syllabus, handouts, notes, assignments, etc. can be found on the course web page hosted by Canvas Learning Management System course login website at http://sjsu.instructure.com. Only officially registered students can access the website. You are responsible for regularly checking with the messaging system through MySJSU at http://my.sjsu.edu to learn of any updates.

Course Description
This course is an introduction to probability and statistical analysis for undergraduate EE students. The main topics covered are discrete probability theory, theory of single random variables, and introduction to statistics and EE applications.

Course Learning Outcomes (CLO)
Upon successful completion of this course, students will be able to:

1. **CLO1 Define a random experiment, outcome, event, certain event, null event, and sample space**

2. **CLO2 Find the probability of an event**

3. **CLO3 Apply set theory in calculation of probabilities**
4. CLO4 Determine whether events are equally likely, mutually exclusive or independent

5. CLO5 Define a random variable; classify random variables as discrete or continuous, compute probabilities from probability mass (density) functions and cumulative distribution functions

6. CLO6 Calculate mean, variance, moments, probabilities associated with a random variable and its transformations

7. CLO7 Compute probabilities (joint and conditional) of two random variables. Test independence of two random variables

8. CLO8 Model and analyze systems with specific EE applications using discrete random variables

9. CLO9 Model and analyze systems with specific EE applications using continuous random variables

10. CLO10 Describe data using statistics such as average, variability, and correlation.

**Required Texts/Readings**

**Textbook**


**Other Readings**

Handouts/Slides will be posted on the course webpage.

**Other technology requirements / equipment / material**

Excel/Matlab/Python/R will be used for statistical data calculations.

**Course Requirements and Assignments**

There will be two midterm exams, a project and a final exam. All exams are CLOSED book and notes. Students can bring a formula sheet (one page-both sides). Exams cover the assigned reading materials and class lecture notes. There will be NO make-up exams.
Assignments will be given regularly and will be due one week from the assigned date. Late submissions will not be accepted. MATLAB/Excel/Python/R (or a similar tool) may be used as a programming language for the homework and the project. There will be regular in-class quizzes.

According to the University Policy S16-9, “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.”

Final Examination or Evaluation

Final exam will be held on Dec. 18 during 9.45am-12.00pm. It will be comprehensive and will be count as 25% of the total grade.

Grading Information

Grades

Midterm 1 (Sept. 24) 20 %
Midterm 2 (Nov. 14) 20 %
Project (Final report due Dec. 10) 15 %
Final exam (Dec. 18) 25 %
Assignments 10 %
In-class pop-up Quizzes 10 %

Total 100%

Assignments and project reports are to be submitted through Canvas in soft copies.

Grading Percentage Breakdown (tentative):

90% and above A
89% - 85% A-
84% - 82% B+
81% - 79% B
78% - 75% B-
74% - 72% C+
Classroom Protocol

Students should turn their cell phones off or put them on vibrate mode while in class. Students are expected to participate in class discussions as well as online discussion in the class website. Asking questions during class-time related to the lectures is encouraged.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs’ Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/

General Expectations, Rights and Responsibilities of the Student

As members of the academic community, students accept both the rights and responsibilities incumbent upon all members of the institution. Students are encouraged to familiarize themselves with SJSU’s policies and practices pertaining to the procedures to follow if and when questions or concerns about a class arises. See University Policy S90–5 at http://www.sjsu.edu/senate/docs/S90-5.pdf. More detailed information on a variety of related topics is available in the SJSU catalog, at http://info.sjsu.edu/web-dbgen/narr/catalog/rec-12234.12506.html. In general, it is recommended that students begin by seeking clarification or discussing concerns with their instructor. If such conversation is not possible, or if it does not serve to address the issue, it is recommended that the student contact the Department Chair as a next step.

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester’s Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html.

Add/drop deadlines can be found on the current academic year calendars document on the Academic Calendars webpage at http://www.sjsu.edu/provost/services/academic_calendars/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/. Students should be aware of the current deadlines and penalties for dropping classes.
Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

Consent for Recording of Class and Public Sharing of Instructor Material

University Policy S12-7, http://www.sjsu.edu/senate/docs/S12-7.pdf, requires students to obtain instructor’s permission to record the course:

- Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor’s permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material.
- Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.

Academic integrity

Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy S07-2 at http://www.sjsu.edu/senate/docs/S07-2.pdf requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The Student Conduct and Ethical Development website is available at http://www.sjsu.edu/studentconduct/.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at http://www.sjsu.edu/aec to establish a record of their disability.
# Course Schedule

Course Schedule (Subject to change with fair notice as announced by instructor in class)

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics, Readings, Assignments, Deadlines</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug 22</td>
<td>Introduction, Set theory</td>
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<tr>
<td>2</td>
<td>Aug 27</td>
<td>Applying set theory to probability, Probability Axioms</td>
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<tr>
<td>2</td>
<td>Aug 29</td>
<td>Conditional probability, Independence, Partitions</td>
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<tr>
<td>3</td>
<td>Sept 3</td>
<td>Labor Day - Campus Closed</td>
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<tr>
<td>3</td>
<td>Sept 5</td>
<td>The law of total probability</td>
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<tr>
<td>4</td>
<td>Sept 10</td>
<td>Tree diagram</td>
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<tr>
<td>4</td>
<td>Sept 12</td>
<td>Counting methods</td>
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<tr>
<td>5</td>
<td>Sept 17</td>
<td>Independent trials</td>
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<tr>
<td>5</td>
<td>Sept 19</td>
<td>Review for Midterm 1</td>
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<tr>
<td>6</td>
<td>Sept 24</td>
<td>Midterm 1</td>
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<tr>
<td>6</td>
<td>Sept 26</td>
<td>Discrete random variables (definition, Probability Mass Function (PMF))</td>
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<tr>
<td>7</td>
<td>Oct 1</td>
<td>Discrete random variables (families)</td>
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<tr>
<td>7</td>
<td>Oct 3</td>
<td>Discrete random variables (The cumulative Distribution Function (CDF))</td>
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<td>8</td>
<td>Oct 8</td>
<td>Discrete random variables (Averages and Expected Value)</td>
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<td>8</td>
<td>Oct 10</td>
<td>Discrete random variables (Functions of a Random Variable and Its Expected Value)</td>
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<tr>
<td>9</td>
<td>Oct 15</td>
<td>Discrete random variables (Variance and Standard Deviation)</td>
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<td>9</td>
<td>Oct 17</td>
<td>Statistics (Introduction, Summary statistics of data)</td>
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<tr>
<td>10</td>
<td>Oct 22</td>
<td>Statistics (Correlation, General Examples) + PROJECT ASSIGNMENT</td>
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<tr>
<td>10</td>
<td>Oct 24</td>
<td>Continuous random variables (sample space and CDF)</td>
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<td>Continuous random variables (Probability Density Function (PDF))</td>
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<tr>
<td>11</td>
<td>Oct 29</td>
<td>Continuous random variables (Expected Values)</td>
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<tr>
<td>11</td>
<td>Oct 31</td>
<td>Continuous random variables (Families)</td>
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<tr>
<td>Week</td>
<td>Date</td>
<td>Topics, Readings, Assignments, Deadlines</td>
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<tr>
<td>12</td>
<td>Nov 5</td>
<td>Continuous random variables (Gaussian Random Variables)</td>
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<tr>
<td>12</td>
<td>Nov 7</td>
<td>Review for Midterm 2</td>
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<tr>
<td>13</td>
<td>Nov 12</td>
<td>Veteran’s Day (Observed) - Campus Closed</td>
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<tr>
<td>13</td>
<td>Nov 14</td>
<td>Midterm 2</td>
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<tr>
<td>14</td>
<td>Nov 19</td>
<td>Pairs of discrete random variables (Joint sample space, Joint PMF)</td>
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<tr>
<td>14</td>
<td>Nov 21</td>
<td>Non-Instructional Day</td>
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<tr>
<td>15</td>
<td>Nov 26</td>
<td>Pairs of continuous random variables (Joint sample space, Joint PDF)</td>
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<tr>
<td>15</td>
<td>Nov 28</td>
<td>Marginal PMFs and Marginal PDFs, Independent random variables</td>
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<td>16</td>
<td>Dec 3</td>
<td>Expected Value of a Function of Two Random Variables</td>
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<tr>
<td>16</td>
<td>Dec 5</td>
<td>Covariance, Correlation, Independence</td>
</tr>
<tr>
<td>17</td>
<td>Dec 10</td>
<td>Review for Final Exam</td>
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<tr>
<td>Final Exam</td>
<td></td>
<td>Tuesday, December 18, 09.45-12.00</td>
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San Jose State University
Electrical Engineering Department

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.