

**San José State University**  
**Department of Electrical Engineering**  
**EE 250, Probability, Random Variables and Stochastic**  
**Processes, Section 01, Fall 2009**

**Instructor:** Jalil Kamali, PhD

**Office Location:** ENGR 383

**Telephone:** (408)924-3950

**Email:** [jalil@ieee.org](mailto:jalil@ieee.org)

**Office Hours:** T/W 17:45-19:00

**Class Days/Time:** M/W 4.30pm-5.45pm

**Classroom:** Industrial 113

**Prerequisites:** EE112 (Linear Systems), EE102 (Probability and Statistical Analysis)

**Faculty Web Page and MYSJSU Messaging**

Copies of the course materials will be posted on my web page (following address) and you are responsible for regularly checking with the web-site.

[www.engr.sjsu.edu/jkamali](http://www.engr.sjsu.edu/jkamali)

**Course Description**

This course is a graduate-level course on probability theory, random processes and their applications in electrical engineering. Topics covered include review of probability, random variables, transform techniques, random processes, filtering of random signals and Markov chains. The course covers random processes in detail: discusses autocorrelation, power spectral density, stationarity, effect of filtering and estimation of random signals. We will also discuss applications of random processes in signal processing, communications and queueing theory.

**Course Content Learning Outcomes**

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

- **LO1** Define a random experiment, outcome, event, certain event, null event, and sample space
- **LO2** Find the probability of an event
- **LO3** Determine whether events are equally likely, mutually exclusive or independent

- **LO4** Define a random variable; classify random variables as discrete or continuous, compute probabilities from probability mass (density) functions and cumulative distribution functions
- **LO5** Calculate mean, variance, moments, probabilities associated with a random variance and its transformations
- **LO6** Compute probabilities (joint and conditional) of two random variables. Test independence of two random variables
- **LO7** Analyze probabilities associated with multiple random variables and with its transformations
- **LO8** Compute covariance and correlation for two random variables
- **LO9** Define a random process and classify random processes
- **LO10** Analyze and characterize random processes in terms of probability density function
- **LO11** Identify if a process is stationary (both strict-sense and wide-sense)
- **LO12** Compute the autocorrelation and the power spectral density of a stationary random process
- **LO13** Define basic properties of a Markov chain and identify if a process is Markov chain
- **LO14** Apply the concepts of probability, random variables and random processes to analyze problems

## **Required Texts/Readings**

### **Textbook**

Probability and Random Processes for Electrical Engineering by A. Leon-Garcia, Prentice Hall, (3rd Ed).

### **Other Readings**

1. Probability, Random Variables, and Stochastic Processes by A. Papoulis and S.U. Pillai, Mc-Graw Hill, 4th Ed., 2002.
2. Introduction to Probability by D.P. Bertsekas and J.N. Tsitsiklis, Athena Scientific, 2nd Ed., 2002.
3. Intuitive Probability and Random Processes using MATLAB by S. Kay, Springer, 2006.

### **Other equipment / material requirements**

Handouts posted on the webpage.

## **Dropping and Adding**

Students are responsible for understanding the policies and procedures about add/drops, academic renewal, etc. [Information on add/drops are available at http://info.sjsu.edu/web-dbgen/narr/soc-fall/rec-298.html](http://info.sjsu.edu/web-dbgen/narr/soc-fall/rec-298.html). [Information about late drop is available at http://www.sjsu.edu/sac/advising/latedrops/policy/](http://www.sjsu.edu/sac/advising/latedrops/policy/). Students should be aware of the current deadlines and penalties for adding and dropping classes.

## **Assignments and Grading Policy**

There will be one midterm exam and a final exam. The midterm is CLOSED book and notes. Students can bring a formula sheet (one page – both sides). The final exam is OPEN book. Exams cover the assigned reading materials and class lecture notes. There will be no make-up exams. Exam solutions will be posted in the web site of the course. Homework assignments will be given regularly. While the students are not asked to hand in the solution and it will not be part of the grading, it is an essential part of learning. Thus students are urged to try to solve these problems on their own. Solutions to these problem sets will also be distributed.

Midterm 1 (OCT 14<sup>th</sup>): 40%  
Final exam (DEC 15<sup>th</sup>): 60%

## **University Policies**

### **Academic integrity**

Students should know that the University's [Academic Integrity Policy is available at http://www.sa.sjsu.edu/download/judicial\\_affairs/Academic\\_Integrity\\_Policy\\_S07-2.pdf](http://www.sa.sjsu.edu/download/judicial_affairs/Academic_Integrity_Policy_S07-2.pdf). Your own commitment to learning, as evidenced by your enrollment at San Jose State University and the University's integrity policy, require 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 website for [Student Conduct and Ethical Development is available at http://www.sa.sjsu.edu/judicial\\_affairs/index.html](http://www.sa.sjsu.edu/judicial_affairs/index.html). Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person's ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include in your assignment any material you have submitted, or plan to submit for another class, please note that SJSU's Academic Policy F06-1 requires approval of instructors.

### **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 requires that students with disabilities requesting accommodations must register with the DRC (Disability Resource Center) to establish a record of their disability.

## **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.