

**UNIVERSITY OF SOUTHERN CALIFORNIA**  
**Simulation Methods for Stochastic Systems**  
**Course Syllabus – FALL 2018 (Draft)**

**Catalog Description:** (1 unit) Project-oriented investigation of simulation methods used for the analysis and design of complex stochastic systems whose operation and performance are affected by random events.

**Corequisite:** EE 503. **Recommended preparation:** MatLab programming experience.

**Lectures:** One hour per week. Lectures will discuss the application of the theory covered in *EE 503 - Probability for Electrical and Computer Engineers* in the design and evaluation of simulation projects.

Section 1 ():

Section 2 ():

Section 3 ():

**Instructor:** Prof. John SILVESTER, EEB 240,  
silvester@usc.edu, +1.213.740.9730 (e-mail preferred)  
Office Hours: TBD

**TA's:** TBD

**Text:** *Simulation*, 5<sup>th</sup> Edition, by Sheldon Ross, Academic Press, ISBN: 978-0-12-415825-2

Students will be expected to have a basic working knowledge of Matlab.

**Projects:** There will be 10 projects exploring simulation (in Matlab) of some probabilistic or stochastic system (corresponding to the lecture topics). The first project (project 0) will not count toward the course grade.

**Grading:** The first project (project 0) will be graded but will not count toward the course grade – consider it a way of getting feedback on what is expected. The remaining projects will generally be worth 10 points. The best 8/9 projects will be used for the semester score, so the total maximum number of points is 80.

Projects will be graded on:

- Program Correctness and Documentation (4 points)
- Description of what Runs were made (and why) (2 points)
- Discussion, Analysis and Presentation of Results (4 points),

On occasion, a few extra points may be assigned for a project “beyond expectations”.

Semester grades will be assigned as shown in the table below.

> 70	A
65-69	A-
60-64	B+
55-59	B
50-54	B-
45-49	C+
40-44	C
< 40	F

## ***Fall 2018: EE 511 Simulation – Class Schedule (subject to change)***

<i>Lect</i>	<i>Week of</i>	<i>Topic</i>
1		Course overview. Simulation concepts. Notions of probability.
2		Some more basic probability concepts.
3		Pseudo-random number generators.
4		Coin Flip Results and Analysis
5		Monte-Carlo techniques
6		Discrete random variables (DRV's)
7		DT Stochastic Systems, DT Markov Chains and Queues
8		DT Queues
9		Continuous RV's (Uniform, Exponential, Normal)
10		Continuous Time Stochastic Processes, CT Markov Chains
11		Generating CRV's, Normal/Gaussian Distribution
12		Statistical analysis
13		Continuous Time Queues, Discrete Event Simulation
14		Variance reduction techniques
15		Advanced Topics – Gibbs Sampler, MCMC

<i>Proj #</i>	<i>Due Date</i>	<i>Points</i>	<i>Probable Topic</i>
0*		0	A Simple Simulation – Coin Tossing
1		10	Exploring Basic Probability Concepts
2		10	Applications of Monte-Carlo Methods
3		10	Interesting Discrete Random Variables
4		10	Discrete time MC queueing Model
5		10	Continuous Random Variables
6		10	Continuous Time Markov Chain/Queue
7		10	Estimators, Statistics, CI's
8		10	Bootstrapping
9		10	Discrete Event Simulation

\* Project 0 is a warmup to get used Matlab and to provide grading feedback. It will be graded but will not count toward final grade.

## 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, <http://policy.usc.edu/scientific-misconduct>.

### Support Systems:

*Student Counseling Services (SCS) – (213) 740-7711 – 24/7 on call*

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

[engemannshc.usc.edu/counseling](http://engemannshc.usc.edu/counseling)

*National Suicide Prevention Lifeline – 1 (800) 273-8255*

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

*Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call*

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

*Sexual Assault Resource Center*

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: [sarc.usc.edu](http://sarc.usc.edu)

*Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086*

Works with faculty, staff, visitors, applicants, and students around issues of protected class.

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

*Bias Assessment Response and Support*

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. [studentaffairs.usc.edu/bias-assessment-response-support](http://studentaffairs.usc.edu/bias-assessment-response-support)

*The Office of Disability Services and Programs*

Provides certification for students with disabilities and helps arrange relevant accommodations.

[dsp.usc.edu](http://dsp.usc.edu)

*Student Support and Advocacy – (213) 821-4710*

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. [studentaffairs.usc.edu/ssa](http://studentaffairs.usc.edu/ssa)

*Diversity at USC*

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students.

[diversity.usc.edu](http://diversity.usc.edu)

*USC Emergency Information*

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. [emergency.usc.edu](http://emergency.usc.edu)

*USC Department of Public Safety – UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime.*

Provides overall safety to USC community. [dps.usc.edu](https://dps.usc.edu)