EE 503: Probability for Electrical and Computer Engineers
Fall 2019

Lecture: MW 6:00-7:50 p.m. in VPD 105
Discussion: W 3:00-3:50 p.m. in VPD 112

Instructor: Christopher Wayne Walker, Ph.D.
Office: EEB 114
Office Hours: MW 5:00-5:50 p.m. in EEB 110
Daytime phone: (310) 812-5176 (voicemail available)
email: chrwalke@usc.edu

TA: Kuan-Wen Huang

Course web page: http://www.cwwphd.com

Text: Required: Probability, Statistics and Random Processes for Electrical and Computer Engineers, 2008.
Author: Alberto Leon-Garcia

First Lecture: Monday, August 26
Last Lecture: Monday, December 2

Course Grading Policy:

Method	Date	Weight
Homeworks	Weekly	10%
Quizzes	Weekly	50%
Final	Wednesday, Dec. 11, 7-9 p.m.	40%

Each quiz will be 10-15 minutes duration. Your best 10 quiz scores will be used for computing your overall quiz score. All quizzes and final exam are closed book and closed notes. The final exam is comprehensive. Scientific calculators are allowed on quizzes and the final exam. No computers or cell phones are allowed for use on quizzes or the final exam nor is any device allowed that has internet capability.

Contact Information: You are welcome to consult with me or your TA during office hours. Please consult with the TA only during his office hours (he is busy with studies like you are). If my office hours are not convenient for you or else you have a question that needs addressing before you can see me then you are welcome to call or email me. Email is the preferred method of contact if I can answer your question with an email response, but if we need to have more interaction then you are welcome to call me. If you call and I cannot speak with you immediately then I will set up a time to call you back to discuss any issues or concerns you may have. I want this course to be a positive learning experience for you so please make sure you get all your questions answered.

Homework: Homework will be assigned regularly. You may work with others on the homework assignments but the work you hand in must be your own and not copied from another student. Homework is due at 6:00 p.m. on the due date. Late homework will be accepted for up to 2 days with 20% penalty.

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 me (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.

Academic Integrity - Cheating
Cheating or plagiarism will not be tolerated on homework or exams. You may discuss homework problems among yourselves, but each person must do their own work and submit individual solutions written in their own hand. Copying or turning in identical homework sets is cheating. The penalty ranges from F on the homework or exam, to an F in the course, to recommended expulsion. See:

https://viterbischool.usc.edu/academic-integrity/
http://sjacs.usc.edu/students/academic-integrity/
https://libraries.usc.edu/research/reference-tutorials

If you have any questions regarding academic integrity - see the instructor.

USC Statement on 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,

(www.usc.edu/scampus or http://scampus.usc.edu) contains the University Student Conduct Code (see University Governance, Section 11.00)

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" https://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. https://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.
http://www.suicidepreventionlifeline.org

Relationship & 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. https://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: 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. https://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. https://studentaffairs.usc.edu/bias-assessment-response-support/

Student Support & Advocacy – (213) 821-4710
Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic.
https://studentaffairs.usc.edu/ssa/

Diversity at USC
Tabs for Events, Programs and Training, Task Force (including representatives for each school), Chronology, Participate, Resources for Students. *https://diversity.usc.edu/*

EE 503 Outline

Fall 2019

Inst: C.W. Walker

Section	Title	Text
1.0	Introduction	Ch. 1
2.0	Set Operations and Notation	Ch. 2
3.0	Probability Measure	Ch. 2
3.1	Sample Space and Events	Ch. 2
3.2	Probability Space	Ch. 2
4.0	Combinatorics	Ch. 2
5.0	Conditional Probability	Ch. 2
5.1	Definition	Ch. 2
5.2	Properties of Conditional Probability	Ch. 2
6.0	Independence of Events	Ch. 2
7.0	Combined Experiments	Ch. 2
8.0	Random Variables	Ch. 3, 4
8.1	Definitions and Comments	Ch. 3, 4
8.2	Distribution Functions	Ch. 3, 4
8.3	Discrete and Continuous Random Variables	Ch. 3, 4
8.4	Density Functions	Ch. 3, 4
8.4.1	Definitions	Ch. 3, 4
8.5	Examples of Random Variables	Ch. 3, 4
8.6	Conditional Distribution and Density Functions	Ch. 3, 4
8.6.1	Definitions and Derivations	Ch. 3, 4
8.6.2	Total Probability and Bayes' Theorem	Ch. 2
9.0	Functions of One Random Variable	Ch. 3, 4
9.1	Finding the Distribution of g(X)	Ch. 4
9.1.1	Discrete Case	Ch. 4
9.1.2	Continuous Case	Ch. 4
9.2	Expectations	Ch. 3, 4
9.2.1	Discrete Case	Ch. 3
9.2.2	Continuous Case	Ch. 4
9.3	Variance	Ch. 3, 4
9.3.1	Discrete Case	Ch. 3
9.3.2	Continuous Case	Ch. 4

Section	Title	Text
9.4	Examples and Additional Results	Ch. 3, 4
9.5	Moments	Ch. 4
9.6	Moment Generating Function	Ch. 4
9.6.1	Examples	Ch. 4
9.7	Characteristic Functions	Ch. 4
9.8	Special Moment Functions	Ch. 4
9.9	Applications of Characteristic Functions	Ch. 4
10.0	Two Random Variables	Ch. 5
10.1	Joint Distribution and Density	Ch. 5
10.2	Independence	Ch. 5
10.3	One Function of Two Random Variables	Ch. 5
10.4	Two Functions of Two Random Variables	Ch. 5
11.0	Moments and Conditional Distributions	Ch. 5
11.1	Joint Moments	Ch. 5
11.2	Joint Characteristic Functions	Ch. 5
11.3	Conditional Distributions	Ch. 5
11.4	Conditional Expected Values	Ch. 5
11.5	Mean Square Estimation	Ch. 5
12.0	Sequences of Random Variables	Ch. 6
12.1	Introduction	Ch. 6
12.2	Transformations of a Random Vector	Ch. 6
12.3	Independence	Ch. 6
12.4	Order Statistics	
12.5	Mean and Covariance	Ch. 6
12.6	Conditional Densities	Ch. 6
12.7	Characteristic Functions	Ch. 6
12.8	Jointly Gaussian Random Variables	Ch. 6
12.9	Central Limit Theorem	Ch. 7
12.10	Statistics: Random Numbers	Ch. 2
12.11	Statistics: Confidence Intervals	Ch. 8
12.11	Mean Square Estimation	Ch. 7
12.12	Stochastic Processes and Stochastic Convergence	Ch. 7, 9
13.0	Statistics: MAP, ML and Heuristic Estimators	Ch. 8
14.0	Markov Processes	Ch. 11
15.0	Markov Chains	Ch. 11

The above outline is tentative and may change if circumstances warrant.