Statistics 67
Introduction to Probability and Statistics for Computer Science

When: MWF 12:00noon-12:50pm
Where: Physical Sciences Classroom Building 140 (building 413 on campus map)
Discussions: W 9:00am-9:50am in SE2 1306 (building 215)
W 1:00pm-1:50pm in SE2 1306 (building 215)

Instructor: Professor Hal Stern
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Course web: www.ics.uci.edu/~sternh/courses/67
Office hours: Wednesday 3:30-4:30pm (also available by appointment)

Teaching Assistant: David Fontenot, 346 Computer Science, dfonteno@uci.edu
Office hours: Thursday 2:00-3:30pm (NOTE – office will move to Bren Hall)

Course goals: Introduce basic concepts of probability and statistical inference with discussion of applications to computer science. Topics include basic probability, conditional probability, random variables, common distributions, statistical inference (estimation, tests, regression).


Grading and Course Requirements: Students will be assigned weekly problem sets (handed out Friday and due the following Friday). There will be a midterm (tentative date is Feb 9) and final exam (tentative date is Mar 19, 1:30-3:30pm). Course grades are determined by performance on this work as follows: homework (20%), midterm exam (35%), and final exam (45%).


Week 1 – Basic Probability: Definition and interpretation of probability; axioms of probability; basic properties of probabilities. (Reading: Sections 2.1-2.4, 2.7)

Week 2 – Working with Probabilities: Counting / permutations and combinations; conditional probability; independence of events; Bayes’ Theorem. (Reading: Sections 2.5, 1.1-1.15, 3.1-3.4)

Week 3 – Random Variables: Discrete case: Introduction to random variables emphasizing the discrete case; expectation, mean, variance. (Reading: Sections 4.1-4.5, 4.9)

Week 4 – Random Variables: Discrete examples: Examples of discrete distributions (binomial, Poisson); introduction to the case of continuous random variables. (Reading: Sections 4.6-4.8)

Week 5 – Random Variables: Continuous case: Examples of continuous distributions (exponential, gamma, normal); emphasis on normal distribution and applications. (Reading: Sections 5.1-5.6.1)

Week 6 – Joint Distributions: Joint and marginal distributions for two or more random variables; expectation; independence of random variables; conditional distributions. (Reading: Sections 6.1, 6.2, 6.4, 7.1-7.5)

Week 7 – From Probability to Statistics: Role of simulation in studying probability distributions; role of sampling in studying populations (transition to statistics). (Reading: Sections 8.1-8.3, 10.1-10.3)

Week 8 – Estimation of Parameters: Point and interval estimation of parameters of probability distributions. (Reading: Lecture notes to be provided)

Week 9 – Statistical Tests and Decisions: Testing hypotheses about parameters and making decisions. (Reading: Lecture notes to be provided)

Week 10 – Linear Regression and other Models: Use linear regression as example of how probability models are used in practice. (Reading: Lecture notes to be provided)