

Stat S4105 PROBABILITY

Summer 2008

Instructor: Qinghua Li

Course Syllabus

(Tentative. Subject to change as lectures proceed.)

W 28 May (Reading: Sec. 1.1-1.5, 2.2-2.4 of Ross)

History of probability.

Ch. 1 Combinatorial Analysis: multiplication of outcomes, permutations and combinations, the binomial theorem and the multinomial theorem.

Ch. 2 Axioms of Probability: axiomatic definition of probability, set operations, inclusion-exclusion formula.

Th 29 May (Sec. 2.5, 3.2, 3.5)

Ch. 2 Axioms of Probability: uniform probability models.

Ch. 3 Conditional Probability and Independence: definition, conditional probability is a probability.

F 30 May (Sec. 3.3-3.4)

Ch. 3 Conditional Probability and Independence: law of total probability, bayes' rule, independence, gambler's ruin and simple random walk.

M 2 Jun

Review and problem-solving.

W 4 Jun

Test 1

Th 5 Jun (Sec. 4.1-4.4, 4.8)

Ch. 4 Random Variables: definition, discrete distributions (Uniform, Bernoulli, Binomial, Geometric, Poisson, Negative Binomial, etc.), expectation.

M 9 Jun (Sec. 4.5, 7.7)

Ch. 4 Random Variables: variance, expectation of functions of r.v.'s.

Ch. 7 Properties of Expectation: moment generating functions, characteristic functions.

W 11 Jun (Sec. 4.6-4.7)

Ch. 4 Random Variables: Binomial approximation, Poisson approximation. *Ex. Poisson Process. (not to be tested on)*

Th 12 Jun (Sec. 5.1-5.7)

Ch. 5 Continuous Random Variables: density, cumulative distribution function, expectation, variance, expectation of functions of r.v.'s, continuous distributions (Uniform, Normal, Exponential, Gamma, etc.).

M 16 Jun (Sec. 6.1-6.5, 6.7, 7.5)

Ch. 6 Jointly Distributed Random Variables: joint, marginal, and conditional distributions, joint distribution of functions of r.v.'s, independent r.v.'s, sum of two independent r.v.'s. *Ex. Markov Chain. (not to be tested on)*

Ch. 7 Properties of Expectation: conditional expectation. *Ex. Martingale.*

W 18 Jun

Review and problem-solving.

Th 19 Jun

Test 2

M 23 Jun (Sec. 7.1-7.4, 7.8, 6.6)

Ch. 7 Properties of Expectation: covariance, Multivariate Normal.

Ch. 6 Jointly Distributed Random Variables: order statistics.

W 25 Jun (Sec. 8.2, 8.5)

Ch. 8 Limit Theorems: inequalities (Markov, Chebyshev, Jensen, etc.).

Th 26 Jun (Sec. 8.3, 8.4)

Ch. 8 Limit Theorems: modes of convergence, strong law of large numbers, weak law of large numbers, central limit theorems. *Ex. Brownian Motion. (not to be tested on)*

M 30 Jun

Test 3

W 2 Jul

Review and problem-solving.

Th 3 Jul

Final exam.