STAT 642: Advanced Probability Theory
Spring 2016

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Office hours: R 9:50-10:50 am, F 3-4 pm

Prerequisites: STAT 641, or STAT 543 and MATH 515

Lecture: TR 2:10-3:30 pm, Town 0206

Textbook: *Measure Theory and Probability Theory* by K. B. Athreya & S. N. Lahiri, Springer text in statistics, 2006.

Other Useful
References: 1. *Probability and Measure*
  - by P. Billingsley (Wiley-Interscience, 1995)
2. *A Probability Path*
  - by S. I. Resnick (Birkhäuser, 1999)

Course Description: The course will generally cover the following topics:

Independence (Chapter 7)

Laws of Large Numbers (Chapter 8)

Convergence in Distribution (Chapters 9-10)

Central Limit Theorems (Chapter 11)

Conditional Expectation (Chapter 12)

Discrete Parameter Martingales (Chapter 13) (Time Permitting)

Course Information

Objectives: The goal of this course is to develop a deeper understanding of probability tools, which are often needed for better understanding of the currently available statistical methodologies as well as for building better statistical methods. We emphasize several concepts in probability theory (e.g., independence, laws of large numbers, convergence in distribution, conditional expectation) that are commonly used to justify, develop and communicate statistical methods. The presentation of the material emphasizes the mathematical details of probability that impart a scientific rigor and credibility to "statistics" as a discipline.

ISU Blackboard: Students can keep track of their grade scores and access all other class material through a Blackboard page for STAT 642. To enter Blackboard, go to "http://www.iastate.edu" and click on "Blackboard". Then enter your ISU username (i.e., your ISU email address without "@iastate.edu") and ISU password. If you have no ISU Net-ID, you need to get one (http://www.it.iastate.edu/services/passwords).

Exams: There will be two midterm exams and a final exam. Each midterm will most likely be administered at an evening time (e.g., 6-8 PM on a Thursday). You may use a calculator and formula sheet for the exams (more details later). If you know that you have a conflict with an exam due to circumstances beyond your control, you must notify me **before** the scheduled exam. Make-up exams are permitted only at the instructor's discretion.

Homework: Weekly homework problems will be assigned throughout the semester to provide opportunities for practice and application (typically due Fridays with some schedule changes around exams). Both the homework problems and their solutions will be posted on the course website in Blackboard. You are welcome to discuss the homework problems with other students but everyone must *independently* write up and submit a homework assignment. Late homeworks will not be accepted.

Grading: Grades will be based on the following criteria:

Component	Weight	Tentative Date
Homework	10%	
Exam 1*	25%	Thursday, February 18, 6:00-8:00 PM
Exam 2*	25%	Thursday, March 31, 6:00-8:00 PM
Final Exam	40%	Friday, May 6, 9:45- 11:45 AM

* Please note that the dates for the midterm exams are tentative and may be changed based on the pace of the course. The final exam date/time are set by the university. You will always be given sufficient notice of an exam. Locations of exams are to be announced.

General ISU Policies for this Course

Academic Dishonesty
The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office.
http://www.dso.iastate.edu/ja/academic/misconduct.html

Disability Accommodation
Iowa State University complies with the Americans with Disabilities Act and Sect 504 of the Rehabilitation Act. If you have a disability and anticipate needing accommodations in this course, please contact (instructor name) to set up a meeting within the first two weeks of the semester or as soon as you become aware of your need. Before meeting with (instructor name), you will need to obtain a SAAR form with recommendations for accommodations from the Disability Resources Office, located in Room 1076 on the main floor of the Student Services Building. Their telephone number is 515-294-7220 or email disabilityresources@iastate.edu . Retroactive requests for accommodations will not be honored.

Dead Week (the last week of the semester prior to final exam week)
This class follows the Iowa State University Dead Week policy as noted in section 10.6.4 of the Faculty Handbook
http://www.provost.iastate.edu/resources/faculty-handbook.
(Essentially, no final exams are allowed in dead week, and no graded submissions of any kind can have due dates in dead week without first informing students at the start of the semester. This is a non-issue in STAT 642, as neither homeworks nor exams will be given/due in this week.)

Harassment and Discrimination
Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact his/her instructor, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodation
If an academic or work requirement conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

Contact Information for any Issues Above
If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu.