

DEPARTMENT OF MATHEMATICAL SCIENCES  
FALL 2021 COURSE ANNOUNCEMENT

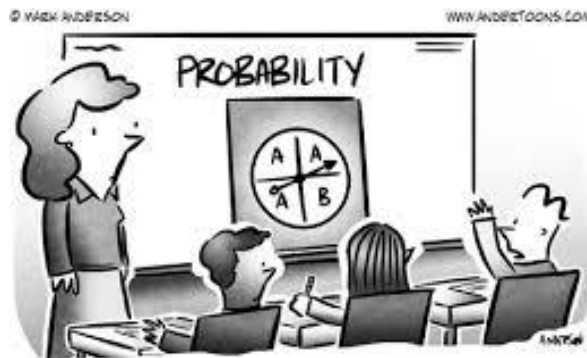
**STAT 421 PROBABILITY THEORY**

MWF 12:00-12:50

Instructor: Dave Patterson, david.patterson@umontana.edu

Probability is not only fundamental to understanding statistical inference, it's also a fascinating subject in itself with many applications. STAT 421 is an essential course for anyone studying mathematical statistics (STAT 422), but also for anyone building or analyzing stochastic models of real phenomena and, in general, reasoning in the face of uncertainty. The course is a mixture of theory and applications. The topics are listed in the course description below. We'll use R for simulations. We'll also learn to use two of the great tools of probability, conditioning and indicator variables, to solve some really difficult-seeming problems (e.g., on average, how many tosses of a fair coin does it take to get two heads in a row?). The excellent textbook, "Introduction to Probability, 2<sup>nd</sup> ed." by Blitzstein and Hwang, is available as a free pdf (<http://probabilitybook.net>) and is also available in hardcover. The listed prerequisite is multivariable calculus but experience in proof-writing as from a course like M 307 is also important (it can be taken concurrently). STAT 341 is recommended for undergraduates, but not required, and no previous familiarity with R is assumed. Please contact me if you have any questions.

Course description: Fundamentals of probability; discrete and continuous random variables; expected value; variance; joint, marginal, and conditional distributions; conditional expectations; applications; simulation; central limit theorem; order statistics.



"I know mathematically that A is more likely,  
but I gotta say, I feel like B wants it more."