

“Suam habet fortuna rationem.” (“Chance has its reasons.”)

Petronius

## MATH 462/662: Intro. to Stochastic Processes

TR 9:30 - 10:45 A.M.

**Instructor:** U. Tuncay Alparslan (augur@unr.edu)

For phenomena arising in areas such as

- economics and management (*finance, insurance, production systems, etc.*),
- biology (*ecological systems, genetics, population dynamics, etc.*)
- computer science (*networks, artificial intelligence, algorithms, etc.*)
- physics and electronics (*particle physics, quantum theory, etc.*)
- (and many more),

it is essential to construct realistic mathematical models to better understand the underlying structure. In doing so one needs to take into account the inherent variation (randomness) that the quantities of interest exhibit. This is usually accomplished by choosing probabilistic models.

This course will introduce a certain class of mathematical objects known as stochastic processes, which are necessary ingredients for building models of a wide variety of phenomena exhibiting time varying randomness.

We will discuss a subset of the following topics: Probability basics; discrete-time Markov Chains and applications to branching processes, birth-death processes, queueing theory; Poisson processes; renewal theory; Brownian motion.

**Text:** S. Ross, *Intro. to Probability Models*, 9th Ed., Academic Press. (In addition to the text, we will use supplementary material available on the web, and instructor’s notes.)

**Prerequisites:** MATH 461/661 or consent of the instructor.