

Advanced Probability for Engineers

TTh 5:00 pm - 6:15 pm

**EECE
6932
Fall-2021**

image courtesy: <https://www.britannica.com/technology/telecommunication>

Why do we need to learn advanced probability?

To be able to truly grasp research papers that are probabilistic in nature in various engineering topics such as digital communications, wireless communication, stochastic control, noise in semiconductor devices, signal processing, statistical/machine learning, Monte-Carlo simulation, computer networks, computing, complex systems, optimization, operation research, finance, and reliability analysis.

To build new analytical and simulation capabilities and confidence to analyze challenging engineering problems.

To have the mathematical foundation for learning further specialized and advanced topics in probability that are encountered in engineering.

Recommended preparation: EECE 6020 or equivalent, EECE 6010 or equivalent (preferred), MATLAB

Instructor: Dr. Majeed Hayat, EECE, Marquette University

WHAT YOU WILL LEARN IN THIS COURSE

Measure theoretic foundation of probability

Deep understanding of the concept of conditional expectation, and its power in solving engineering problems

Deep understanding of the concept of projections in a Hilbert space, and their use in prediction and signal estimation

The concept of convergence of stochastic sequences

Markov chains and their use in applications

Rare event modeling and analysis

Markov chains and their use in applications

Examples of key stochastic processes and their