

EE 497B

**Probability and Random Processes
for Electrical Engineers**

Lecture 29

Professor Jeffrey Schiano
Department of Electrical Engineering

Lecture 29 Topics

- Expected values
 - Covariance
 - Correlation
 - Orthogonal Random Variables

Expected Values (From Lecture 28)

- **Theorem 4.12:** For random variables X and Y , the expected value of $W = g(X, Y)$ is

$$\text{Discrete: } E[W] = \sum_{x \in S_X} \sum_{y \in S_Y} g(x, y) P_{X,Y}(x, y)$$

$$\text{Continuous: } E[W] = \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} g(x, y) f_{X,Y}(x, y) dx dy$$