

MATH 301
Probability Theory
METU Mathematics Department
FALL SEMESTER - 2025

Titles of Videos:

- 1) Math 301-1: Section 1.1 Sample Spaces and Probabilities
- 2) Math 301-2: Section 1.2 Random Sampling
- 3) Math 301-3: Section 1.2 Random Sampling (Continued), Section 1.3 Infinitely Many Outcomes.
- 4) Math 301-4: Section 1.4 Consequences of the Rules of Probability
- 5) Math 301-5: Section 1.4 Consequences of the Rules of Probability (Continued), Section 1.5 Random Variables
- 6) Math 301-6: Section 1.5 Random Variables (Continued)
- 7) Math 301-7: Section 2.1 Conditional Probability
- 8) Math 301-8: Section 2.2 Bayes' Formula, Section 2.3 Independence
- 9) Math 301-9: Section 2.3 Independence (Continued)
- 10) Math 301-10: Section 2.4 Independent Trials
- 11) Math 301-11: Section 2.5 Conditional Independence
- 12) Math 301-12: Section 2.5 Conditional Independence (Continued), Section 3.1. Probability Distributions of Random Variables
- 13) Math 301-13: Section 3.1. Probability Distributions of Random Variables (Continued)
- 14) Math 301-14: Section 3.2. Cumulative Distribution Function
- 15) Math 301-15: Section 3.2. Cumulative Distribution Function (Continued) (Section 2)
- 16) Math 301-16: Section 3.2. Cumulative Distribution Function (Continued) (Section 1)
- 17) Math 301-17: Section 3.3. Expectation of a Random Variable
- 18) Math 301-18: Section 3.3. Expectation of a Random Variable (Continued)
- 19) Math 301-19: Section 3.4. Variance of a Random Variable
- 20) Math 301-20: Section 3.4. Variance of a Random Variable (Continued), Section 3.5. Gaussian Distribution
- 21) Math 301-21: Section 3.5. Gaussian Distribution (Continued), Section 4.1. Approximation of the Binomial Distribution
- 22) Math 301-22: Section 4.1. Approximation of the Binomial Distribution, Examples
- 23) Math 301-23: Section 4.1. Proof of the Central Limit Theorem for Binomial Distributions
- 24) Math 301-24: Section 4.2. Law of Large Numbers
- 25) Math 301-25: Section 4.3. Applications of Normal Approximation
- 26) Math 301-26: Section 4.4. Poisson Approximation
- 27) Math 301-27: Section 4.4. Poisson Approximation (Continued)
- 28) Math 301-28: Section 4.5. Exponential Distribution
- 29) Math 301-29: Section 4.5. Exponential Distribution (Continued)
- 30) Math 301-30: Section 4.5. Exponential Distribution (Continued), Section 5.1. Moment Generating Functions

- 31) Math 301-31: Section 5.1. Moment Generating Functions
- 32) Math 301-32: Section 5.2. Distribution Function of a Random Variable
- 33) Math 301-33: Section 5.2. Distribution Function of a Random Variable (Continued).
- 34) Math 301-34: Section 6.1. Joint Distributions of Discrete Random Variables.
- 35) Math 301-35: Section 6.1. Joint Distributions of Discrete Random Variables (Continued), Section 6.2. Joint Continuous Random Variables
- 36) Math 301-36: Section 6.2. Joint Continuous Random Variables (Continued).
- 37) Math 301-37: Section 6.3. Joint Distributions and Independence.
- 38) Math 301-38: Section 6.3. Joint Distributions and Independence (Continued).
- 39) Math 301-39: Section 7.1. Sums and Symmetry.
- 40) Math 301-40: Section 7.2. Exchangeable Random Variables.
- 41) Math 301-41: Section 8.1. Linearity of Expectations.
- 42) Math 301-42: Section 8.2. Expectations and Independence.
- 43) Math 301-43: Section 8.2. Expectations and Independence (Continued).
- 44) Math 301-44: Section 8.3. Sums and Generating Functions, Section 8.4. Covariance and Correlation.
- 45) Math 301-45: Section 8.4. Covariance and Correlation (Continued).
- 46) Math 301-46: Section 8.4. Covariance and Correlation (Continued), Section 9.1. Estimating Tail Probabilities.
- 47) Math 301-47: Section 9.1. Estimating Tail Probabilities (Continued), Section 9.2. Law of Large Numbers.
- 48) Math 301-48: Section 9.3. Central Limit Theorem, Section 9.4. Monte Carlo Method.