# MTH 561: Mathematical Statistics I

Updated: 6/26/20



| **Week** | **Dates** | **Videos (Chapters)** | **In-Class Activity** |
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| 1 | Aug. 17 – 21 | Introduction to probability (2.1-2.4)  Probability and counting rules (2.5-2.6) | Lab 1: Introduction to probability and counting |
| 2 | Aug. 24 – 28 | Conditional probability and independence (2.7-2.8)  Bayes’ Rule and the Law of Total Probability (2.10) | Lab 2: Conditional probability and Bayes’ Rule |
| 3 | Aug. 31 – Sep. 4 | Probability mass functions (3.2)  Expected value and variance (3.3)  Binomial distribution (3.4)  Geometric distribution (3.5) | Lab 3: Discrete distributions |
| 4 | Sep. 7 – 11 | Negative binomial distribution (3.6)  Poisson distribution (3.8) | Lab 4: Identifying discrete distributions and using RStudio |
| **5** | **Sep. 14 – 18** | **Review** | **Exam 1** |
| 6 | Sep. 21 – 25 | Probability density functions (4.2)  E(X) and V(X) for continuous variables (4.3)  Uniform distribution (4.4)  Normal distribution (4.5) | Lab 5: Continuous distributions |
| 7 | Sep. 28 – Oct. 2 | Gamma distribution (4.6)  Beta distribution (4.7)  Bivariate distributions (5.2) | Lab 6: More continuous distributions and RStudio |
| 8 | Oct. 5 – 9 | Marginal and conditional distributions (5.3)  Independent random variables (5.4)  Expected value of a function of random variables (5.5-5.6) | Lab 7: Conditional distributions, independence, and expected value of functions |
| 10 | Oct. 12 – 16 | Covariance (5.7)  Expected value and variance of linear functions (5.8)  Conditional expectations (5.11) | Lab 8: Covariance, linear functions, and hierarchical distributions |
| **11** | **Oct. 19 – 23** | **Review** | **Exam 2** |
| 12 | Oct. 26 – 30 | Method of distribution functions (6.2-6.3)  Method of transformations (6.4) | Lab 9: Transformations |
| 13 | Nov. 2 – 6 | Moment-generating functions (3.9, 4.9)  Method of moment-generating functions (6.5)  Order statistics (6.7) | Lab 10: MGFs and order statistics |
| 14 | Nov. 9 - 13 | Sampling distributions (7.2)  Central Limit Theorem (7.3) | Lab 11: Sampling distributions |
| 15 | Nov. 15 – 16 | Review |  |
| **Final Exam** | **Thursday, November 19** |  |  |